

UNITED STATES AND SOVIET CIVIL DEFENSE PROGRAMS

HEARINGS
BEFORE THE
SUBCOMMITTEE ON
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OF THE
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UNITED STATES AND SOVIET CIVIL DEFENSE PROGRAMS

TUESDAY, MARCH 16, 1982

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL, OCEANS,
INTERNATIONAL OPERATIONS, AND ENVIRONMENT OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:15 a.m., in room 4221, Dirksen Senate Office Building, Hon. Larry Pressler (chairman of the subcommittee) presiding.

Present: Senators Pressler, Pell, Tsongas, and Cranston.

Senator PRESSLER. I will call this meeting to order. This is a hearing on United States and Soviet civil defense. What it boils down to is, could we survive a nuclear attack, and could the Soviet Union?

There has been speculation that we could survive a first strike if nuclear weapons are used. There has been speculation that the Soviets have a better system of civil defense than we have, and, in part, that testimony was given in closed session this morning because of classification needs.

The Subcommittee on Arms Control is looking into and has oversight responsibilities for U.S. national security programs. In one sense this morning's hearing is a continuation of a series of hearings begun last November on President Reagan's proposed strategic force modernization program. Whereas the committee looked into strategic offensive weapons last November, including the B-1, the MX, and the Trident, this year we will be concentrating more on strategic defensive programs, such as civil defense and ABM [antiballistic missiles].

I think civil defense is very important. The average citizen is aware of the nuclear threat and says, where would I go if a nuclear bomb landed or if there were nuclear ash floating around? With all of the discussion about a freeze on nuclear arms, even if we had a freeze, we would still have all of the existing nuclear arms in the world, and our citizens are concerned about what would happen to them during a nuclear attack situation.

The hearing this morning will address two separate but intricately related aspects of the ongoing debate on civil defense. First, what the Soviets are up to. Is their program effective in the sense that it is a significant factor affecting the strength and credibility of our strategic retaliatory capabilities. Second, what level of planning and effort is appropriate for the U.S. civil defense program? Does civil defense represent a priority expenditure of our scarce defense dollars?

Some have said maybe there is no defense against a nuclear attack. Should we be spending dollars on it, and are our dollars well spent

or are they wasted? That is a question that we face today and faced in the closed hearing that already has occurred.

Some Senators are still asking additional questions next door in the closed hearing, but to move forward, we have begun our open session.

Beyond the technical, fiscal, and strategic aspects of the debate on civil defense, there is also an important moral dilemma that also must be addressed. For in this debate, both sides, the advocates and the critics alike, appear to be claiming that morality is on their side. Advocates of a greater U.S. civil defense effort contend that the U.S. Government has a moral obligation to try to preserve American life should deterrence fail and the unthinkable, an actual nuclear war, occur.

Critics charge that by trying to minimize the catastrophic effects of a nuclear war, civil defense increases the chance that we might persuade ourselves that nuclear war is somehow survivable or winnable or in so doing make it more likely that a nuclear war might occur.

The subcommittee has just received in closed session a briefing on the Soviet civil defense program by the CIA [Central Intelligence Agency] and DIA [Defence Intelligence Agency]. We will now hear from a group of administration officials, led by Mr. Richard Perle, Assistant Secretary of Defense for International Security Policy. The administration testimony will be followed by a panel of public witnesses.

Before we hear Mr. Perle's opening statement, I would like to call my colleagues' attention to a procedural matter that has developed with respect to this hearing. Earlier this year, when the subcommittee was holding public hearings on the future of arms control, Senator Cranston and I were quite disturbed to read an interview in the Los Angeles Times with Mr. T. K. Jones, Deputy Under Secretary of Defense for Research and Engineering, Strategic, and Nuclear Theater Systems. In the interview, Mr. Jones declared that with a proper civil defense effort, the United States could fully recover from an all-out nuclear war with the Soviet Union in only 2 to 4 years. According to Mr. Jones, "Everybody's going to make it if there are enough shovels to go around."

Because Mr. Jones' assertions so completely contradict the testimony of other groups that testified before the committee both in California and South Dakota in January and Washington in November, Senator Cranston requested that the subcommittee convene a hearing early this year at which Mr. Jones would be asked to justify his views. In late January, committee staff contacted Mr. Jones and invited him to appear before the subcommittee. At that time, staff specifically asked Mr. Jones to confirm with his superiors that the Defense Department would have no objection to his speaking on behalf of the Department on civil defense matters.

Mr. Jones subsequently advised staff that there would be no such objection, and the hearing was scheduled for March 4. The subcommittee later learned that the Federal Emergency Management Agency [FEMA] could not participate in the March 4 hearing due to a previously scheduled civil defense exercise. Since Mr. Jones had advised the subcommittee that he could only testify on civil defense if FEMA was also present at the hearing, the subcommittee agreed to reschedule the hearing to March 16.

Late last Friday afternoon, committee staff was advised that the Defense Department had decided not to allow Mr. Jones to testify. Although I personally telephoned Secretary Weinberger's office late Friday, and again yesterday, and again this morning, to protest this 11th hour decision, the Defense Department has refused to comply with our earlier agreement, and as you see, Mr. Jones is not with us this morning, unless he is suddenly appearing.

Now I am aware that Mr. Jones is attending another hearing at this hour, and we may be advised that this is the reason that he cannot be present this morning. However, I am also aware that the question of Mr. Jones' attendance at this hearing was a matter of a very high level discussion late last week, and that the Department's refusal to allow him to be subjected to public questioning was taken as a matter of policy, not due to a scheduling conflict, and indeed, if he is in another area in the building, why, we can perhaps send a messenger out for him, and capture him, and bring him over. We would love to hear from him.

In any event, Mr. Perle, I must say that I find this decision to be regrettable in the extreme, and a direct affront to this subcommittee. We did not schedule this hearing to suit Mr. Jones' schedule, only to have him yanked at the last minute. Mr. Jones is evidently authorized by his superiors to function as a Department spokesman on civil defense matters.

In addition to his January interview, I noticed that just yesterday the Los Angeles Times featured a lengthy article by Mr. Jones in which he defended the administration's civil defense proposal. Nowhere in this article did Mr. Jones declare he was expressing personal views. Rather, he is clearly identified in his byline as a Deputy Under Secretary of Defense.

It would seem that Mr. Jones is permitted by the Pentagon to make public statements on civil defense before any audience in the United States except this subcommittee, and I would like to know why. There are only two possible explanations. One is that the Defense Department does not support his rather extreme views on civil defense, that is, that it does not regard him as an informed or competent witness on this subject. If this is so, I would like to know why he is permitted to write articles, give interviews, and address public gatherings.

The other possible explanation is that the Defense Department is simply afraid to expose Mr. Jones' views to the wider public audience likely to be occasioned by this hearing, in short, that you are worried that your civil defense proposal cannot stand the light of day.

Mr. Perle, will you advise this subcommittee exactly why the Defense Department has reneged on its prior agreement to send Mr. Jones before this hearing to explain his public statements on civil defense?

Are you aware that Mr. Jones had previously advised staff there would be no objection from his superiors to his appearing?

When, exactly, was the decision reached not to send him up?

Why was not a decision reached earlier?

Why was this decision not communicated to me directly?

Does the Defense Department regard Mr. Jones as an authorized spokesman on civil defense matters?

All of these questions I am sure you are eager to answer, but first, I will yield to Senator Cranston.

Senator CRANSTON. Thank you, Mr. Chairman.

At the outset, I want to commend the chairman of this subcommittee, Larry Pressler, for granting my personal request that hearings be held on the Reagan administration's startling new civil defense proposal. I believe it is essential that this subcommittee and the American people examine the assumptions upon which this administration's scheme is based.

We were just briefed by the CIA on the Soviet preparations for civilian defense. I must say that I was not impressed by either the purported effectiveness or scale of the Soviet effort, and I do not think that any of my colleagues were impressed.

This hearing was, as the chairman indicated, expressly called to hear Mr. Jones, the ranking administration expert on civil defense, who apparently is now being gagged by the Department of Defense. I have some questions, too, that I wish to ask Mr. Perle, who is here instead of T. K. Jones. I think it is highly improper for the Defense Department and the Reagan administration to gag T. K. Jones by refusing to let him fulfill his commitment to testify today.

It cannot be on the grounds of Mr. Jones being too busy. Today or yesterday, rather, a piece by him about civilian defense appeared in the Los Angeles Times. If he has time to write for the Los Angeles Times, he has time to fulfill his responsibilities and appear before a committee of the Senate.

I think the American people have a right to hear what their Deputy Under Secretary of Defense thinks about the prospects of surviving nuclear war. I think that T. K. Jones should either be allowed to testify, to explain his interpretations of the administration's policy, or if the administration now wishes to disavow his views, he should be fired.

I want to announce that I will explore with you, Mr. Chairman, and with Chairman Percy and with Senator Pell, my interest in subpoenaing Deputy Under Secretary T. K. Jones to see to it that he appears, if he remains in this position in our Government.

With the exception of a brief scare around the time of the Cuban missile crisis, every President since President Eisenhower, Republican and Democrat alike, has rejected grandiose schemes for defense against an all-out nuclear attack. From deep within the bowels of the bureaucracy, plans have occasionally been brought forward to pour hundreds of millions of dollars into civilian defense. Often these have been the same plans, dusted off and run by a new administration.

Each administration has rejected these plans—rejected them not because they do not care about defending American citizens, and of course they do, and every Senator does, but rejected them because they appear to be a waste of money. They appear to be a waste of money because they cannot and will not defend the core of our society and our natural environment from being incinerated by a full nuclear exchange. They are a waste of money seemingly because there is little prospect that there will be a meaningful warning of a nuclear attack, or that nuclear war between the United States and the Soviet Union, once begun, could be limited.

A riveting series of articles by Jonathan Schell, published recently in the New Yorker, aptly described the possible consequences of an all-out nuclear exchange in terms which have been verified and gone unchallenged by numerous distinguished scientists.

Mr. Schell wrote:

The possible consequences of the detonations of thousands of megatons of nuclear explosives include, and then there is a litany of what that might well include in terms of results, the blinding of insects, birds, and beasts all over the world, the extinction of many ocean species, among them some of the base of the food chain, the temporary or permanent alteration of the climate of the globe, with the outside chance of dramatic and major alterations in the structure of the atmosphere, the pollution of the whole ecosphere with oxides of nitrogen, the incapacitation in ten minutes of unprotected people who go out into the sunlight, the blinding of people who go out into the sunlight, a significant decrease in photosynthesis in plants around the world, the scalding and killing of many crops, the increase in rates of cancer and mutation around the world, but especially in the targeted zones, and the attendant risk of global epidemics, the possible poisoning of all vertebrates by sharply increased levels of Vitamin D in their skin as a result of increased ultraviolet light, and the outright slaughter on all targeted continents of most human beings and other living things by the initial nuclear radiation, the fireballs, the thermal pulses, the blastwaves, the mass fires, and the fallout from the explosion, and considering that these consequences will all interact with one another in unguessable ways, and furthermore, are in all likelihood an incomplete list which will be added to as our knowledge of earth increases, one must conclude—one must conclude—that a full-scale nuclear holocaust could lead to the extinction of mankind.

Dr. Fred Ikle, who served as the Director of the Arms Control and Disarmament Agency [ACDA] under Presidents Nixon and Ford, and now serves as Under Secretary of Defense for Policy under President Reagan, has stated that severe reduction of the ozone layer through nuclear explosions could "shatter the ecological structure that permits man to remain alive on this planet."

Now, it is in the face of such a grim danger that the Reagan administration has come forward with a request for what, if granted by Congress, would be the largest civil defense appropriation in our Nation's history. Amidst much public discussion by administration officials about limited nuclear war, surviving nuclear war, and nuclear demonstration blasts, we have Deputy Under Secretary of Defense T. K. Jones being quoted in the press as saying that the United States could recover fully from an all-out nuclear war in just 2 to 4 years with a Soviet-style civil defense system, a system which rather plainly, based upon the briefing we just had, is not going to protect any substantial percentage of the Soviet population.

"Everybody's going to make it," Mr. Jones recently told Robert Scheer of the Los Angeles Times, "if there are enough shovels to go around." After reports that OMB foresaw a pricetag as high as \$10 billion on this civilian defense program, FEMA Director Giuffrida recently testified that the Reagan administration is embarking on a complete program to protect the population of the United States against the possibility of a nuclear attack.

I believe this scheme is a cruel and dangerous delusion. It is cruel because it misleads people, although I do not think they will be misled, but it could. It could mislead them into having a false sense of security that the fabric of our society can survive an all-out nuclear war. It is dangerous because it encourages the destabilizing notion that nuclear war is survivable, tolerable, and winnable, and it is a dangerous squandering of precious economic resources.

I am eager to learn from our administration witnesses this morning, even though T. K. Jones is absent, what possibly has changed that has led the administration to believe that civil defense against an all-out nuclear attack is any more viable than it was when rejected by so many recent past Presidents, one after the other.

This issue has been studied time and again, and the premise of the Reagan administration program has been rejected time and again. Hearing records have been built using ACDA and CIA studies that utterly reject survivalist fantasies, but here we are again today, to learn if there is anything new behind the Reagan administration proposal to nearly double our civil defense budget in 1 year and to quadruple spending on nuclear attack civil preparedness.

I am one Senator who will listen with a great deal of skepticism.

Senator PRESSLER. Senator Tsongas?

Senator TSONGAS. Mr. Chairman, I would like to have introduced into the record at this point an article by Dr. Abrams, who is with the Physicians for Social Responsibility, concerning the medical effects of a thermonuclear exchange. I would ask that it be placed in the record.

Senator PRESSLER. Without objection.

[The material referred to follows:]

[Reprinted from the New England Journal of Medicine, Nov. 12, 1981]

SPECIAL REPORT: MEDICAL PROBLEMS OF SURVIVORS OF NUCLEAR WAR

INFECTION AND THE SPREAD OF COMMUNICABLE DISEASE

The nature of the medical problems confronting survivors of a nuclear war has not been widely conveyed or fully understood. Perhaps the most logical approach is to view this matter in sequence, from the moment of attack through the periods that follow. The characteristic elements of each period can be delineated, with the reservation that the duration cannot be precisely stated. The type and severity of the initial injury will clearly affect the response to new medical problems as they arise. Each problem may be expected to extend beyond the period in which it is initially encountered (table 1).

Table 1. Medical Problems During the Attack and Post-attack Periods

MEDICAL PROBLEM *	BARRAGE PERIOD	SHELTER PERIOD		SURVIVAL PERIOD	RECOVERY PERIOD	
	FIRST HOUR	FIRST DAY	FIRST 6-8 WKS		LONG-TERM EFFECTS	FUTURE GENERATIONS
Flash burns	+	—	—	—	—	—
Trauma and blast injury	+	—	—	—	—	—
Flame burns and smoke inhalation	+	+	—	—	—	—
Acute radiation	+	—	—	—	—	—
Fallout radiation	+	+	+	+	—	—
Suffocation and heat prostration	—	+	+	—	—	—
General lack of medical care	—	+	+	+	—	—
Dehydration	—	—	+	—	—	—
Communicable diseases	—	—	+	+	—	—
Exposure and hardship	—	—	+	+	—	—
Malnutrition	—	—	+	+	—	—
Cancer	—	—	—	—	+	—
Genetic damage	—	—	—	—	—	+

* Listed in the approximate chronologic order in which they appear.

The effects of burn, blast, and radiation have dominated the discussions of the post-attack period. But in the intermediate term, infection and the spread of communicable disease may represent the most important threat to survivors.

The United States that we will view will have undergone a 6559-megaton attack. The magnitude of such an attack—the so-called CRP-2B model¹ used by the Federal Emergency Management Agency in civil-defense planning¹ reflects the world of the 1980s. In terms of yield, it represents 524,720 Hiroshima bombs. The targets of attack, in order of priority, will have included the following: military installations; military-supporting industrial, transport, and

¹ Haaland CM, Chester CV, Wigner EP. Survival of the relocated population of the U.S. after a nuclear attack. Springfield, Va.: National Technical Information Service, 1976: 20-1. (Defense Civil Preparedness Agency report no. ORNL-5041).

logistic facilities; other basic industries and facilities that contribute to the maintenance of the economy; and population concentrations of 50,000 or greater. (Some 4000 megatons will have been detonated on urban areas and population centers.)

Moments after the attack, 86 million people—nearly 40 percent of the population—will be dead. An additional 34 million—27 percent of the survivors—will be severely injured. Fifty million additional fatalities are anticipated during the shelter period, for a total of 133 million deaths. Many of the millions of surviving injured will have received moderate to high radiation doses. Approximately 60 million may survive and emerge from the shelter period without serious injury and with relatively limited radiation exposure.

The periods under consideration are as follows:

Barrage period.—The explosions almost instantaneously inflict millions of lethal and nonlethal blast, thermal, and immediate radiation injuries on those caught in and around the blast areas.

Shelter period.—For days or weeks after the attack, survivors of the initial explosions attempt to sustain themselves in fallout shelters amid intense radiation, fires, and deprivation.

Post-shelter survival period.—Fallout has reached an "acceptable" level that allows survivors to emerge for variable times. Food and shelter must be found. The injured must be nursed, the dead buried, debris cleared, the harvest reaped, and the next harvest sown. In a primitive and hazardous environment, survival is the only coherent goal.

"Recovery" period.—Survival has been accomplished, and some kind of recovery initiated. A societal structure is emerging; food supplies have been secured, shelter obtained, and communities established. A primitive social system, with potentially intense regional and intraregional competition for food supplies, faces all the problems of underdeveloped countries. Long-term effects of the attack become apparent. During the early years, the first cases of radiation-induced leukemia appear; later, the solid cancers will develop in the lungs, thyroid, breast, and colon.

The problem of infection and communicable disease must be addressed during the shelter period and more particularly during the post-shelter survival period.² The potential impact of this problem on the recovery process is clear. It can only be examined realistically in the context of survival conditions: food, water, antibiotics, burn and blast residue, and radiation and its effects. First, however, the nature of the threat itself must be clarified. Why is the likelihood of infection so much greater in the post-attack world?

BASIS FOR INCREASED RISK AND SEVERITY OF INFECTION

Most survivors will have increased susceptibility to infection for two reasons: the pervasive direct effects of nuclear weapons and the subsequent pressures and hardships confronted. Several factors will be of special importance.

Radiation

Radiation affects the immune system in a number of different ways, not the least of which is its capacity to injure the bone marrow and the lymph nodes. Hematologic effects may occur with doses as low as 50 rems. The following changes must be anticipated in varying degrees: decreased antibody response,⁴⁻⁶ decreased effectiveness of cellular defense mechanisms,⁷ decreased effectiveness of immunizing agents,³ and increased susceptibility to some toxins.³ Thus, vaccination will be less effective.

Radiation also has a major effect on the mucosa of the intestine. "Ulceration . . . spreads through the entire gastrointestinal tract. . . . The multiplication of bacteria, made possible by the decrease in the white blood cells of the

² Sullivan RJ, Guthe K, Thoms WH, Adelman FL. Survival during the first year after a nuclear attack. Washington, D.C.: Defense Civil Preparedness Agency, 1979:140. (Federal Emergency Management Agency report no. SPC-488).

³ Voors AW. Epidemiological considerations for the prevention of post nuclear attack epidemics. Research Triangle Park, N.C.: Research Triangle Institute, 1967. (Office of Civil Defense report no. RM-OU-332-4).

⁴ Dixon FJ, Talmage DW, Bukantz SC. Radiosensitive and radioresistant phases in antibody production. Fed Proc. 1951; 10: 407, abstract.

⁵ Dixon FJ, Talmage DW, Maurer PH. Radiosensitive and radioresistant phases in antibody response. J Immunol. 1952; 68: 693-700.

⁶ Tallaferrro WH, Tallaferrro LG, Janssen EF. The localization of x-ray injury to the initial phases of antibody response. J Infect Dis. 1952; 91: 105-24.

⁷ Donaldson DM, Marcus S, Gyi KK, Perkins EH. The influence of immunization and total body x-irradiation on intracellular digestion by peritoneal phagocytes. J. Immunol. 1956; 76: 192-9.

blood and injury to other immune mechanisms of the body, allows an overwhelming infection to develop."⁸ The ulcerated mucosa provides a portal into the bloodstream for gram-negative organisms, with bacteremia as a certain result. These organisms are frequently difficult to control with antibiotics.

Federal estimates indicate that 23 million survivors of a large-scale nuclear war will suffer from radiation sickness,⁹ implying a mean dose of 200 rems or more. But the number of persons receiving doses between 100 and 200 rems will probably equal that number, so that 50 percent of the population may have lowered resistance to disease from radiation exposure alone.¹⁰

Trauma and burn casualties

Among the millions with trauma or burns or both over a third will also have radiation sickness.¹¹ Aside from the risk of infection related to open wounds, there is a known synergy between burns and radiation that profoundly increases the mortality rate.

The organisms that will infect the burn sites include *pseudomonas* and *seratia*. Both may be troublesome—even in patients with normal immune mechanisms—and will be difficult to eradicate in a population with altered immunity.

Malnutrition and starvation

During the shelter period available quantities of food will vary. In some locales, fallout may prevent emergence from shelter to a point at which health would deteriorate. Previously healthy, well-nourished adults can maintain health for several weeks with only minimal amounts of nutrition,¹² but infants and young children may have severe malnutrition due to insufficient or inappropriate foods during an extended stay in the shelter.¹³

In the uncertain post-attack environment, food will take on an immense value, and persons or regions with food supplies may be reluctant to relinquish their holdings.¹⁴ When survivors emerge from their shelters most of the food stores in urban areas will have been destroyed; other supplies will probably be consumed during, or soon after, the shelter period.¹⁵

One source that may remain available is grain stored on and off farms in small towns and rural areas. This will vary considerably in amount during the course of the year. It may support the surviving population from 200 to 500 days, with great dependence on the next harvest.¹⁶

During the immediate post-shelter period, obtaining, transporting, and distributing grain to hungry survivors, wherever they are located, will be the most important survival activities. These efforts will be hampered by the negative correlation between population and grain density in the United States.¹⁷ Fuel shortages may pose another problem, since it has been estimated that as much as 90 percent of the United States' refining capacity could be destroyed.¹⁸ Farmers may be forced into bitter competition with grain transporters for the use of fuel; this would lead to an ironic choice between hunger today through a lack of grain shipments and hunger tomorrow through poor agricultural production. In many populated parts of the country, famine will be a reality.

A reasonable level of nutrition is essential to control infection. Malnutrition lowers physiologic resistance to disease and heightens susceptibility to pathogenic organisms.¹⁹

⁸ Glasstone S. Dolan P.H. eds. The effects of nuclear weapons. Washington, D.C.: United States Department of Defense and United States Department of Energy, 1977: 586.

⁹ United States Congress Senate Committee on Labor and Human Resources. Subcommittee on Health and Scientific Research. Short and long-term health effects on the surviving population of a nuclear war. (Hearing, 96th Congress, 2nd Session). Washington, D.C.: Government Printing Office, 1980.

¹⁰ Goen R.L. Brown S.L. Clark E.D. et al. Analysis of national entity survival. Stanford, Calif.: Stanford Research Institute, 1967. (Office of Civil Defense report no. SRI-7979-007).

¹¹ Research report on recovery from nuclear attack. Washington, D.C.: Government Printing Office, 1979: 12. (Defense Civil Preparedness Agency report no. 307).

¹² Kearny C.H. Nuclear war survival skills. (Report no. ORNL-5037). Oak Ridge, Tenn.: Oak Ridge National Laboratory, 1979.

¹³ Brown W.H. Yokelson D. Postattack recovery strategies. Croton-on-Hudson, N.Y.: Hudson Institute, 1980: 30. (Federal Emergency Manpower System Agency report no. H-3100 RR).

¹⁴ Haaland C.M. Chester C.V. Wigner E.P.: 109-15.

¹⁵ Gallano R.J. Sustainance of survivors. Arlington, Va.: Decision-Science Applications, Inc., 1977: section 3.4. (DSA Log no. 6).

¹⁶ Haaland C.M. Chester C.V. Wigner E.P.: 153.

¹⁷ Gallano R.J. Medical and health problems. Arlington, Va.: Decision-Science Applications, Inc., 1977: section 1.4. (DSA report no. 4).

Dehydration

It is estimated that a healthy person in the hot environment of a fallout shelter would need about 4 liters (1 gal.) of water per day to prevent dehydration.¹² Furthermore, the incidence of diarrhea and vomiting is expected to be high among survivors of a nuclear attack. No water is normally stored in public fallout shelters, and no means of transporting or storing water will necessarily be available. For the third of the population in areas in which the initial radiation level is over 3000 rems per hour, it will be at least five days before radiation levels allow them to leave the shelter for up to one hour per day.¹³ Some may die of dehydration in the shelter; survivors will be profoundly weakened and far less able to resist infection. When water is available, there will be great difficulty in making certain that it remains uncontaminated.

Exposure and hardship

Widespread destruction of urban housing will occur, with major damage to rural housing as well. Heating fuel may be unavailable. General hardship will be accompanied by the need for intensive labor, with exhaustion, fatigue, and poor nutrition promoting great vulnerability to infection.

Lowered natural resistance to disease

Surviving Americans will experience the underdeveloped world as their natural habitat for the first time. Unlike the inhabitants of impoverished lands, however, Americans, because of lack of exposure to many organisms, may not have the high natural immunity to a host of dangerous diseases that allows many in the Third World to survive. The normal production of antibodies to infectious agents among the developed nations has clearly been altered, perhaps partially because of the easy availability of antibiotics. With potential destruction of the pharmaceutical industry, as well as post-attack disorganization and chaos, antibiotics will be in short supply for countries that have depended on them.

The successful campaigns to eliminate the lethal epidemics, such as cholera and typhoid fever, have been accompanied by a failure to develop resistance to these diseases. Even with our past vaccination policies, 74 percent of the population was thought to be unprotected from smallpox.¹⁴ This may be academic if smallpox has truly been eradicated, as some have claimed. But a store of smallpox virus remains at the Centers for Disease Control in Atlanta as a precaution in the event that vaccine should be required. If the Centers were to experience the blast of a nuclear weapon in the region, the virus might soon be out of control. Reintroduction of such "exotic" diseases might find the population incapable of handling them, as were American Indians who were exposed to diseases of Europeans.

Measles, whooping cough, and diphtheria may be rampant in nonimmunized infants, and beta-hemolytic streptococcal infections will be widespread.

FACTORS INCREASING THE SPREAD OF DISEASE

Shelter conditions

Large public shelters may operate under severe space limitations, with thousands packed into inadequate areas. Under these circumstances, hepatitis and respiratory and gastrointestinal infections may spread rapidly. Most shelters will lack adequate or functioning forced ventilation.¹⁵ Heat, humidity, and the absence of a continuous flow of fresh air will encourage the spread of infective microorganisms.

The length of time that fallout radiation necessitates basement and underground occupancy will be an important determinant of the spread of disease. This period may well be one week to several months.¹⁶ Even after outside work is permissible, it may still be necessary to eat, sleep, and rest in the fallout shelters. "The spread of respiratory and other diseases . . . would be difficult to control in long-occupied shelters."¹⁷

¹² Haaland CM, Chester CV, Wigner EP.¹ 39, 61-3.

¹³ Ayres RU. Environmental effects of nuclear weapons. Croton-on-Hudson, N.Y.: Hudson Institute, 1965. (Office of Civil Defense report no. HI-518-RR).

¹⁴ Effects of nuclear war. Washington, D.C.: Arms Control and Disarmament Agency, 1979: 23.

¹⁵ Kearny CH.¹² 94-5.

Sanitation

Many familiar barriers to the spread of communicable disease—a sanitary water supply, properly prepared and refrigerated food, sewage treatment, and waste disposal—will be seriously compromised in the post-attack environment. In their absence, a host of enteric diseases not yet encountered by most Americans may be expected to spread widely. These include infectious hepatitis, *Escherichia coli* infection, salmonellosis, shigellosis, amebic dysentery, and possibly typhoid and paratyphoid.

Insects

Insects are generally more resistant to radiation than are human beings. This fact, along with the prevalence of corpses, waste, and untreated sewage, the depletion of birds, and the destruction of insecticide stocks and production, will engender a huge increase in insect growth. "Mosquitoes would multiply rapidly after an attack. . . . The fly population would explode. . . . Most domestic animals and wild creatures would be killed. Trillions of flies would breed in the dead bodies."²³ Uncontrolled growth in the insect population, combined with a failure to provide adequate sanitation, may sharply limit the capacity to control such diseases as typhus, malaria, dengue fever, and encephalitis.¹⁹

Corpses

The millions of corpses left in the wake of a nuclear attack will pose a serious disease threat. In many areas, radiation levels will be so high that corpses will remain untouched for weeks. With transportation destroyed, survivors weakened, and a multiplicity of post-shelter reconstruction tasks to be performed, corpse disposal will be complicated.

Animals

Like human beings, domestic animals such as cats and dogs will have altered immunity. Diseases of dogs such as brucellosis and leptospirosis may spread from animals to surviving persons. Cats and dogs injured or running wild will feed on carrion and be exposed to swarms of flies or other insects. Rabies may involve not only cats and dogs but also raccoons, foxes, and skunks. In some areas, wild rabid animals may become a major hazard.

FACTORS LIMITING THE RESPONSE TO INFECTION

Government organization

The United States has developed an extraordinary ability to take effective countermeasures against communicable diseases. In 1947, a man infected with smallpox mingled with New York City crowds for several days. More than 6,350,000 persons were immediately vaccinated; as a result, only 12 additional cases appeared. More recently, the unfortunate "swine flu" episode illustrated how the hint of an epidemic can bring enormous medical resources to bear on the threat.

But coherent efforts to control and limit the spread of disease require a surviving government, organized geographic units, communication networks, and an environment in which physicians and health officials are able to perform their tasks.

All these conditions are dubious in the post-attack world. Most radio contact will be eliminated by nuclear weapons' effects.²² Treating the wounded will require the full commitment of available medical resources. The huge number of injured, the tenuous food situation, massive industrial destruction, the enormous tasks of removing debris and disposing of bodies, and the disparity between "food-rich" and "food-poor" regions will seriously undermine interregional cooperation.¹⁴

Disease detection and diagnosis

Health measures against potential epidemics depend on the involvement of physicians. Casualties among physicians and other health personnel will approximate 80 percent. This is higher than the casualty percentage of the population as a whole (73 percent) because physicians are disproportionately represented in the large cities. Government estimates suggest that there may be 79,000 uninjured physicians surviving a large-scale attack. They will have 32 million injured

²³ Broad WJ. Nuclear pulse (1): awakening to the chaos factor. *Science*. 1981; 212: 1009-12.

to treat, of whom 18 million have radiation sickness and 14 million have trauma or burns or both. If only the trauma and burn victims are included, this represents a ratio of about 177 acutely injured patients for every uninjured physician.⁹ If there is a serious epidemic, it will affect physicians as well. More physicians will become incapacitated as the number of sick people increases, further raising the injured-to-physician ratio.

Laboratories are essential for detection and diagnosis of communicable disease; however, they will be highly vulnerable to the effects of an attack. Of the 50 State Public Health Laboratories and six Federal Communicable Disease Centers, only 11 are in low-risk areas. None of the surviving laboratories will be able to provide tests for such diseases as amebiasis or plague.²³

Inadequacy of countermeasures

Control of enteric and vector-borne disease requires supplies of pure water and uncontaminated food, disposal of sewage and waste, and the removal of breeding areas for insects and rodents. Many of these countermeasures will be unavailable in the post-attack period. The spread of respiratory disease will be greatly enhanced by the crowded quarters and poor ventilation of fallout shelters. Antibiotics and immunization seem essential to stemming epidemics; but in this case, how effective will they be?

Antibiotics.—Antibiotics are generally ineffective in combating viral disease and cannot limit the spread of such infections as smallpox or viral gastroenteritis. Several dangerous bacterial diseases such as diphtheria and tetanus respond poorly to antibiotics.²⁴ Furthermore, the demand for antibiotics will be large. If laboratory tests are not available, antibiotics will be prescribed for all undiagnosed ailments. Stores of antibiotics will be largely destroyed in urban centers, and those still intact may be inaccessible for days or weeks because of intense fallout radiation. Rural stocks may be more plentiful because of farmers' stockpiling for livestock. It is believed that a massive nuclear attack would virtually eliminate the pharmaceutical industry.²⁵ The strictest rationing of antibiotics will therefore be essential so that they can be available when they are most needed.

Immunization.—For several hazardous diseases, such as tetanus, poliomyelitis, measles, and whooping cough, immunization is the only effective direct means of control. In post-attack conditions, however, the effectiveness of vaccination programs will be diminished by the impact of radiation on the immune system. Millions who will have had substantial radiation doses, and who will therefore need immunization most of all, will benefit least. Accurate diagnosis, although essential, may be impossible in the absence of adequate laboratory facilities. If an unfamiliar disease or a new strain emerges, existing supplies will be useless. Production of the specific vaccine in quantity will be difficult, if not impossible.

POTENTIAL PATHOGENS IN THE POST-ATTACK WORLD

Studies performed in the late 1960s identified 23 diseases that might be important in the post-attack environment.²⁶ Many of these are encountered in endemic form throughout the country.²⁷ Among them, potential sources of epidemics may be divided into two categories (Table 2). The first includes the classic epidemic diseases, which fortunately are of low incidence; the second comprises diseases of higher incidence but low mortality.²⁸ Respiratory diseases, including viral pneumonias, influenza, pneumococcal and streptococcal infections, and tuberculosis, will particularly affect those living in crowded blast or fallout shel-

²³ Johnston DR, Laney MN, Chessin RL, Warren DG. Study of crisis administration of hospital patients; and study of management of medical problems resulting from population relocation. Research Triangle Park, N.C.: Research Triangle Institute, 1978: V-32. (Defense Civil Preparedness Agency report no. RTI/1532/00-04F).

²⁴ Staackman M, Van Horn WH, Foget CR. Damage to the drug industry from nuclear attack and resulting requirements for repair and reclamation. San Mateo, Calif.: URS Research Company, 1970: 3. (Office of Civil Defense report no. URS 796-4).

²⁵ United States Congress, Joint Committee on Defense Production. Economic and social consequences of nuclear attacks on the United States. Washington, D.C.: Government Printing Office, 1979: 19-20.

²⁶ Johnston DR, Laney MN, Chessin RL, Warren DG.²³ V6-8.

²⁷ Annual summary. Morbid Mortal Weekly Rep. 1980; 28: 3.

²⁸ Mitchell HH. Guidelines for the control of communicable disease in the post-attack environment. Santa Monica, Calif.: R&D Associates, 1972. (Defense Civil Preparedness Agency report no. RDA-TR-051-DCPA).

ters, with an augmented impact on the young and the old. The diarrheal diseases, such as salmonellosis, shigellosis, campylobacter infection, and viral gastroenteritis, will be widely prevalent. Although their mortality rates are usually low, they will increase substantially owing to the presence of radiation injury to the gastrointestinal tract. Furthermore, these diseases, as well as infectious hepatitis, may spread rapidly in the absence of adequate sewage disposal, pasteurized milk, or appropriate sanitary precautions. The group of diseases endemic to rural sections—and thus dangerous to evacuated populations—includes rabies, plague, and tetanus. A number of other diseases such as cholera or influenza may spread rapidly in devastated areas.¹⁹

A more detailed look at two among the many diseases that are generally considered well controlled in Western society will indicate the roots of the concern for the role of communicable disease in the transformed post-nuclear world.

TABLE 2.—POTENTIAL EPIDEMIC DISEASES

<i>Group 1: Epidemic Disease of Low Incidence</i>	<i>Group 2: Serious Existing Diseases</i>
Cholera	Diarrhea
Malaria	Diphtheria
Plague	Hepatitis
Shigellosis	Influenza
Smallpox	Meningitis
Typhoid fever	Pneumonia
Typhus	Tuberculosis
Yellow fever	Whooping cough

Tuberculosis

Tuberculosis, the "Great White Plague" of the 19th century, was a lethal infection for large segments of the population. Death rates ranged as high as 550 per 100,000 in New York City.²⁰ If the annual United States death rate of 184.7 per 100,000 from tuberculosis during the period 1900 to 1904 characterized our present population of 225 million, all the United States deaths from World Wars I and II, Korea, and Vietnam would be surpassed in one year and 10 days.

Should this concern us for the post-attack period, when we know that the mortality rate of tuberculosis has fallen below 1/200th of the 1900-1904 figures? In 1978 there were only 2830 deaths and 28,521 new active cases in the United States.²⁰ This change is largely attributable to improved socioeconomic circumstances; in the past, particularly in times of war, the incidence and mortality of tuberculosis have frequently been seen to rise and fall with altered societal conditions. In World War I, for example, mortality from tuberculosis increased 218 percent in Warsaw, reaching a rate of 974 per 100,000 in 1917. During World War II, the death rate rose 268 percent in Berlin, 222 percent in Warsaw, and 134 percent in Vietnam. An analysis of 2267 chest roentgenograms at the Dachau concentration camp at the time of liberation showed that 28 percent had evidence of tuberculosis, of which nearly 40 percent was "far advanced."²¹

All the factors that would increase the susceptibility to and the spread of infection would be particularly applicable to tuberculosis. The destruction of housing, lack of fuel, shortages of food, medicine, and clothing, and a sustained period of labor and struggle would create precisely the setting in which tuberculosis has flourished in the past.

Crowding.—Crowded living conditions are likely to become the norm for survivors. Crowding will begin in the shelter period and continue during the post-shelter phase because of the destruction of housing stock. Tuberculosis has been known to spread rapidly under such conditions. In 1959, for example, an outbreak occurred aboard a United States Navy destroyer. Despite vigorous efforts at control, 26 percent of the ship's 236-man crew became infected during an 18-month period.²²

Exposure and Stress.—Stress, fatigue, exposure, and hardship will produce an infirm and weakened work force in whom relapse of latent cases and susceptibility to new infection will be widespread.

²⁰ Mitchell HH. Survey of the infectious disease problem as it relates to the post-attack environment. Santa Monica, Calif.: Rand Corporation, 1966: 50. (United States Atomic Energy Commission report no. RM-090-TAB).

²¹ Centers for Disease Control. Tuberculosis in the United States 1978. Washington, D.C.: Department of Health and Human Services, 1980: 2.

²² Mitchell HH. The problem of tuberculosis in the post-attack environment. Santa Monica, Calif.: Rand Corporation, 1967. (United States Air Force report no. RM-5362-PR).

²³ Ochs CW. The epidemiology of tuberculosis. JAMA, 1962; 179: 247-52.

Undernourishment.—Poor nutritional status has traditionally been associated with increased incidence and mortality from tuberculosis.³¹ This relation is perhaps most striking during wartime.³² The post-attack diet will consist mainly of grains and beans,³³ and will be deficient in animal protein.

Lack of Previous Exposure.—Fewer Americans have been exposed to tuberculosis today than ever before. There are numerous examples of catastrophic epidemics of tuberculosis among largely unexposed populations. South African troops in World War I had a mortality rate of 1.45 per 100,000 from tuberculosis, whereas British troops had a rate of only 11 per 100,000.³⁴ In the post-attack period, the disease may be particularly virulent among Americans because of the lack of immunity.

Radiation.—Studies in Hiroshima showed no increase in tuberculosis a few years after the bombing,³⁵ but the data on the immediate and intermediate post-bombing periods are unclear. It is known that immunosuppressive therapy is an important risk factor for converting latent tuberculosis to active tuberculosis, and many survivors of a massive nuclear war will have received substantial doses of radiation, with important effects on their immune systems. In the post-nuclear world, radiation—together with crowding, cold, stress, malnutrition, and lack of prior exposure—may predispose survivors to serious tuberculosis problems.

Plague

Plague has been a source of epidemics for the past 3500 years. In the 20th century alone, over 12 million deaths have been attributed to it.

Plague is endemic among wild rodents in the 11 westernmost states,³⁷ and human contact with wild rodents is almost exclusively the source of plague in this country.³⁸

A nuclear attack will create almost ideal conditions for breaching the "thin protective wall" against plague.³⁹ Western territories now relatively devoid of inhabitants may receive an influx of refugees from threatened or devastated urban areas. (Relocation plans call for enormous increases in the population of many remote regions.⁴⁰ Humboldt County, California, for example, will have a fivefold or greater increase in population.) Without existing dwellings, these urban refugees are likely to build earth-covered, "expedient" shelters in undeveloped areas. Such shelters might provide good fallout protection, but they would surely create ideal conditions for transmission of plague from rodents.

Rodents are relatively resistant to plague. They harbor chronic infections and may act as a reservoir for the disease. Radiation will increase their susceptibility, as well as that of human beings. High mortality among wild rodents will then help spread the disease to nearby persons. The more resistant fleas will leave the dying animals and search for another, perhaps human, host. At the same time, conditions in the damaged cities will continue to be favorable for the spread and propagation of plague, while the available harborage and food will ensure an increase in the rat population. (A growth rate of 3 to 11 percent would be expected in the commensal rat population.⁴¹) Domestic rats, should they become infected, would further spread the disease among human populations.

A major danger comes not only from bubonic plague transmitted by rats but also from person-to-person pneumonic plague.⁴² Under post-attack conditions, radiation and stress may raise the conversion rate of bubonic to pneumonic plague to 25 percent.⁴³ This highly contagious disease may be especially dangerous among the survivors of a nuclear attack.⁴⁴

The complexity of the control process in the post-attack environment may be readily understood from a consideration of the measures required, as noted by Mitchell: maintenance of external quarantine, maintenance of plague surveil-

³¹ Schatzle NS, Taylor CE, Gordon JE. Interactions of nutrition and infection. WHO Monograph Ser. 1968; 57: 61, 69-70, 88, 98.

³² Tuberculosis and nutrition. *Tubercle*, 1948; 29: 20-1.

³³ Pogrand RS. Nutrition in the post-attack environment. Santa Monica, Calif.: Rand Corporation, 1966. (United States Atomic Energy Commission report no. RM-5052-TAB).

³⁴ Turner RW, Hollingsworth DR. Tuberculosis in Hiroshima. *Yale J Biol Med*. 1963; 36: 165-82.

³⁵ Johnson T, Johnston DR. Vectorborne disease and control. Research Triangle Park, N.C.: Research Triangle Institute, 1968. (Office of Civil Defense report no. R-OU-303).

³⁶ Benenson AS. Plague. In: Top FH, Wehrle PF, eds. Communicable and infectious diseases. St. Louis: CV Mosby, 1972; 451.

³⁷ Mitchell HH. Plague in the United States; an assessment of its significance as a problem following a thermonuclear war. Santa Monica, Calif.: Rand Corporation, 1966. (United States Atomic Energy Commission report no. RM-4868-TAB).

³⁸ Haaland CM, Chester CV, Wigner EP. 35.

³⁹ Bahmanyar M, Cavanaugh DC. Plague manual. Geneva: World Health Organization, 1976: 59.

lance, maintenance of central regional diagnostic laboratory facilities, maintenance of production of antimicrobial drugs, maintenance of production of immunologic agents, capacity for water and sewage control, maintenance of food quality control, capacity for insect-vector control, and capacity for rodent control.

QUANTITATIVE ESTIMATES OF INFECTION IN THE POST-ATTACK PERIOD

Assuming a uniform risk across the country, it is possible that 12 per cent of the survivors may contract plague; in half, it would be fatal. Some believe that plague may spread more widely and that it probably represents "the major national threat among the set of vectorborne diseases."³⁷

In the aggregate, deaths from acute communicable diseases among the survivors may approach 20 to 25 percent.⁴² Estimates of both the incidence and the mortality of infection in the post-attack world vary widely for different diseases (figure 1). Enteric⁴³ and respiratory⁴⁴ diseases represent major threats to survival.

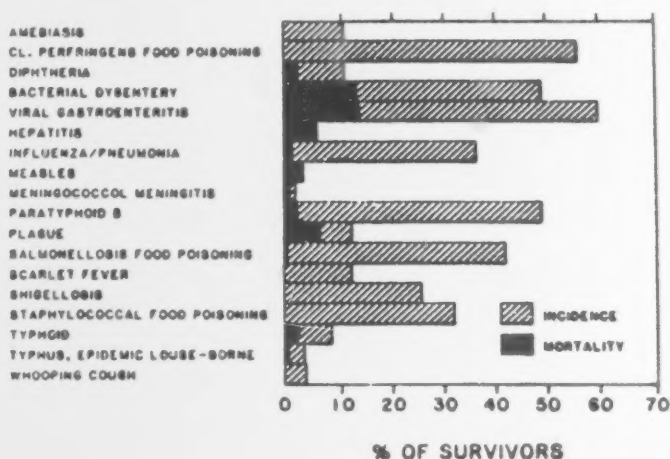


Figure 1. Estimated Incidence and Mortality of Acute Epidemic Diseases among United States Population Exposed to the Effects of Nuclear Weapons.

These composite figures show (in black) the anticipated mortality and (in the hatched areas) the incidence of the disease. The figures assume no medical countermeasures and are based on the best available estimates from a variety of sources.^{3,19,27,29,42-44} These estimates are subject to error due to variations in the magnitude, timing, and locale of the attack. In a conflict of lessened intensity, in which medical resources could be exploited, mortality figures would be reduced correspondingly.

In a computer simulation of the effects of a single nuclear explosion 14 km (9 miles) south of New Orleans, it was calculated that, in the absence of medical countermeasures, 35 percent of the survivors would die from infectious diseases in the first year after the attack.⁴⁰ For purposes of comparison, the expected number of deaths from noncommunicable diseases, such as heart disease or diabetes, is estimated to be between 2.5 and 3 percent of the survivors,⁴² whereas cancer mortality is expected to involve a few percent or less.⁴⁵

⁴² Hill EL, Voors AW, Lyday RO, et al. National emergency health preparedness study, including the development and testing of a total emergency health care system model. Research Triangle Park, N.C.: Research Triangle Institute, 1968. (Office of Civil Defense, Office of the Secretary of the Army report no. R-OU-332).

⁴³ Johnston DR, Fogel ME, Voors AW, Hill EL. Post-attack prevention and control of enteric diseases. Research Triangle Park, N.C.: Research Triangle Institute, 1969. (Office of Civil Defense report no. R-OU-406).

⁴⁴ Voors AW, Harris BSH. Post-attack communicable respiratory diseases. Research Triangle Park, N.C.: Research Triangle Institute, 1970. (Office of Civil Defense, Office of the Secretary of the Army report no. R-OU-493).

⁴⁵ Sullivan RJ, Guthe K, Thomas WH, Adelman FL.² 156.

CONCLUSIONS

Several factors point to an increased risk of serious infection and communicable disease in the post-attack environment. These include the effects on susceptibility of irradiation, malnutrition, and exposure; the effects on disease transmittal of unsanitary conditions, lengthy stays in shelters, and the growth of insect populations; and the effects on attempted countermeasures of depleted antibiotic stocks, shortages of physicians, the destruction of laboratories, and the general disorganization sure to follow an attack.

Although this threat has been considered small in comparison to the direct effects of nuclear weapons, its potential impact both on survivors and on the recovery process itself requires careful consideration. Previous studies may have been overly optimistic in their assumptions and analyses. First of all, the synergistic effects of increased susceptibility, easier disease transmittal, and less effective countermeasures are uncertain. Secondly, some studies have assumed the post-attack survival situation to be favorable, with plentiful food, and functioning governmental and health organizations. Thirdly, the profound effects of epidemics on post-attack recovery—leading to further famine and disease—have not been adequately calculated. Fourthly, lethal, highly infectious, and largely uncontrollable diseases of low incidence in the United States have been assumed to stay at low incidence in the post-attack period. A breakout of one or more could greatly increase the number of deaths.

Although no existing data prove that catastrophic epidemics will occur in the post-attack period, the matter is one of overwhelming importance and uncertainty. What is certain is that infection will pose a substantial threat to health and recovery for all those injured by blast, heat, and radiation, and that the resources to grapple with this threat will be inadequate.

HERBERT L. ABRAMS, M.D.
WILLIAM E. VON KAENEL

Harvard Medical School, Boston, Mass.

Senator TSONGAS. Mr. Chairman, I would like to commend the administration for creating an arms control constituency. If you will remember, during the SALT process, when most of the discussion that you heard in the public press was rational, you could not get a letter from a constituent on arms control or SALT. It was a nonissue. The administrations come in and talk about a winnable nuclear war, limited nuclear war, talked about a demonstration nuclear shot across the bow, and the average American has looked and listened and has been horrified.

I think the administration has done a great deal to create the nuclear freeze movement and a serious push for arms control, because it happens to me, too. I don't think that very many days go by, Mr. Chairman, when I do not think about my children and the prospect of nuclear war. Now, if the administration wants to engage in right-wing ideology and destroy the economy, I suppose we can live with it, but if they wish to engage in rightwing ideology and destroy my children, I for one am not going to stand by.

I think we should get the T. K. Joneses of this administration out before the TV cameras, before the media, and let the people of this country take a good, hard look, and let them realize that indeed, if they end up with 20 minutes left of their lives to contemplate what this madness is all about, they can at least fix in their minds the people who bring it about.

Mr. Chairman, about a month ago I went on a B-52 flight out of Griffith Air Force Base in New York, and after 5 hours I came back. I asked them to show me the nuclear weapons. I had never seen one. So they took me to a hangar where they had about 15 or 16 nuclear weapons. They were just stacked there like air compressors. I went over and I tried to link the piece of metal I saw before me with what it means, that there are living and breathing human beings, children,

et cetera, who, if we don't do our job correctly, will be obliterated by that piece of machinery.

What is interesting about the discussion that takes place in this city on these issues is that it is remarkably amoral. In fact, it is fashionable in the arms control community not to allow emotion or feelings to intervene in one's analytical process, and there is a premium put on having an amoral capacity, not immoral, just simply devoid of moral responsibility.

That attitude, I would argue with you, Mr. Chairman, is limited to this city. If you go around this country and talk about these issues in that way, people will think you are crazy. Cambridge, Mass., is not only the home of Harvard and MIT, but it is also the home of many blue-collar people. If you look at the city council, that pretty much reflects that. A number of communities in my State have been told where they will go, the evacuation plans, in the case of a nuclear war. Some are going to Greenfield. Some are going to Laconia, which not only horrifies Cambridge, it horrifies Greenfield and Laconia.

What has happened is that these kinds of plans have finally forced the average American to think about nuclear war, and to realize that it is not all academic, that I am going to be asked to take my family and go down route 2 with the other 3 million people in the State and try to get to Greenfield. That has brought home in a very real way the issue of nuclear war.

There have been demonstrations in Europe. Hundreds of thousands of people have come out. Why? We are not doing anything different under this administration than we did under the Carter administration. The difference is, people get up and talk about winnable nuclear war, or limited nuclear war, and it finally comes home to people that, my God, these guys might really mean what they say. "Dig a hole, cover it with a couple of doors, and then throw 3 feet of dirt on top. It is the dirt that does it."

Mr. Chairman, I would like to say that I enjoy my job, and I worked hard to get here, but if there is one issue for which I would jeopardize my job, it is the survival of my children. Those of you who would like to engage in the rightwing ideology to show the Soviets how tough we really are, if you tried to do it and endanger my family, I will do everything, everything that I can to stop it. I did not bring these children into the world to have some mindlessly, ideologically incinerate them. There is no way I can express, Mr. Chairman, how strongly I feel about that, and the limits to which I will go to prevent that from occurring.

I commend you for holding this hearing. I will not listen to these witnesses. I want Mr. Jones. Let him come up here. I think by continuing this session we are in essence giving the administration an excuse to keep those "thinkers" under wraps for the very simple reason that if the average American listens to Mr. Jones and reads these materials, they are going to be horrified, and the arms control constituencies will grow and grow and grow.

This is the ultimate issue in my State, in Vermont, and in others. I will say to the administration, you have tapped, I think, the strongest emotion that we have, and that is one's concern about one's children. The arms control movement is nothing more than, not survival for we oldtimers who were stupid enough to bring it about, but the survival of our children.

You have tapped into that, and you are going to see the results of it. That dynamic is going to grow and hopefully will take with it some of the absurd thinking that we see.

Mr. Chairman, I support the notion of getting Mr. Jones here. When he comes, I will be here, and I would like to have at him, not only for my sake, but for the sake of those people I go home to every night, and about whom I happen to care very deeply. Thank you.

Senator PRESSLER. May I say to the Senator from Massachusetts that I have consulted with Republican and Democratic members of the committee, and we have determined that we would ask the present witnesses only about Mr. Jones' absence, and to go to the full committee to take steps to get him here. So, that is the procedure. I did talk this morning to the other Senators, Republican and Democratic, but we do not have a committee decision on that.

So, this morning, it is my decision as chairman of this subcommittee not to hear the testimony except to the extent of commenting on the absence of T. K. Jones.

So, Mr. Perle, if you would proceed along those lines, and yield to questions from my two colleagues, I would much appreciate it. I have already stated my questions.

TESTIMONY OF HON. RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE, INTERNATIONAL SECURITY POLICY, DEPARTMENT OF DEFENSE

Mr. PERLE. Mr. Chairman, let me be certain that I understand what you are saying. Do I understand you to say that you are not interested in the Department of Defense view of the administration's civil defense program, that you are only interested—

Senator PRESSLER. Now, that is not what I said. You heard what I said.

Mr. PERLE. You are only interested in my comment today on Mr. Jones' absence from this hearing.

Senator PRESSLER. That's right. I am very interested in the Department of Defense point of view, but the Department of Defense point of view has been expressed in newspapers across the country repeatedly by Mr. Jones. It seems to contradict what you have submitted as testimony. We would like to have him sitting here beside you. Is he in the building? Can you send someone after him?

Mr. PERLE. I believe he is appearing before another committee.

Senator PRESSLER. Which committee?

Mr. PERLE. I think the Appropriations Committee.

Senator PRESSLER. Can you send someone to see if he can come up?

Mr. PERLE. I am not in a position to send someone.

Senator PRESSLER. Who is?

Mr. PERLE. What I would like to make plain, if I may, is that this administration, like any administration, assigns responsibility for different programs to different offices. Responsibility for the Defense Department oversight role with respect to civil defense does not lie with Mr. Jones. It lies with the Office of the Under Secretary of Defense for Policy.

Senator PRESSLER. Mr. Perle, I know all of that, but we rescheduled this hearing twice to suit his convenience, and then all of a sudden Friday we were told that he can't come. Now, I like to work with you.

I have been very courteous. In fact, I am supposed to be in my State today, and I have rescheduled my own schedule to meet his schedule. There is some level of working together, and to be called on Friday afternoon to be told that the fellow we originally called these hearings to hear from can't come seems very strange to me.

You know, I know how these hearings work. This is my eighth year in Congress. You don't have to go through the thing about, am I not interested in hearing the Defense Department's point of view. Of course, I am. That is why I have scheduled these hearings. I held field hearings for the first time in 26 years.

I am very interested in this, and I am very courteous—I certainly hope I have been very courteous in this matter. I have rescheduled this two times. I don't mean to put a halo on myself, but I rescheduled this for Mr. Jones' convenience so that he could be here, so where is he? Why isn't he here?

Mr. PERLE. I am here to present to the subcommittee the view of the Department of Defense—

Senator PRESSLER. I know that you are here.

Mr. PERLE [continuing]. On the administration's program. Now, if you don't want me to describe the administration's view, I will refrain from doing so, but I came here this morning to do that.

Senator PRESSLER. Well, I intend to take it up with the full committee. I have never done this before, but I have never been treated this way before by any Department in my years up here. It is not a personal thing. I don't know what our powers of subpoena are, if it is that important, or what, but I just don't know that we can tolerate this sort of activity.

If you have Mr. T. K. Jones doing Op Ed pieces and speaking and giving interviews, saying things that are quite contrary to what you say, and if the Senate committee that has oversight responsibility wants to look into that, we have a right to hear from him. That is my point of view. That is my view of my job. I am just trying to do my job. You have yours to do, and I have mine. I hope you understand that.

Mr. PERLE. If I may suggest, it seems to me the most productive course would be to get on the record an authoritative statement of the view of the administration.

Senator PRESSLER. I don't want to do that today. We may do that at a future time, but I want to take it up with the full committee, if I have the support of my colleagues. I will get the support on my side of the aisle.

Senator Cranston, do you have any comment at this point?

Senator CRANSTON. Yes, just briefly. T. K. Jones is Deputy Under Secretary of Defense for Research and Engineering, Strategic and Theater Nuclear Systems. That is a quite important position, I presume. He has important responsibilities. He has been making remarkable statements, and I think we are entitled to hear directly from him. He has been the spokesman for the administration on civilian defense. He has made some statements that seem to me to be incredible. I would like to hear from him, and if he is not speaking for the administration, and, therefore, cannot be permitted to appear before this committee, it seems to me that the administration should dispense with his services.

That is all that I have to say on that subject until we either hear from Mr. Jones in this committee or find that he no longer is a spokes-

man for the administration and is no longer employed by the administration.

Mr. PERLE. Senator, I think it is going a bit far to suggest, as you evidently are, that Mr. Jones should be fired because he made a remark with which you and perhaps others on this committee disagree.

Senator CRANSTON. I am by no means suggesting that he be fired. That is up to the administration. But I am trying to find out whether or not he speaks for the administration. If he does, he should be here and not hide before some other committee.

Mr. PERLE. But the fact that I am here rather than Mr. Jones is the answer to your question. I am here to speak for the Department of Defense. T. K. Jones does not speak for the Department of Defense on these matters.

Senator PRESSLER. Let me say that normally I would agree with you, but T. K. Jones specifically cleared his appearance before this committee with his superiors in January, and so advised the committee. Just yesterday he had an article in the Los Angeles Times written as a spokesman for the Defense Department. Normally, you would be right. The administration picks the witnesses. They approved of him to come. Are you aware that we rescheduled this hearing for his convenience?

Mr. PERLE. I am aware of that.

Senator PRESSLER. I do not normally do that. How was the decision made on Friday?

Mr. PERLE. Well, Mr. Chairman, I apologize for the inconvenience.

Senator PRESSLER. We are going around in circles.

Mr. PERLE. The fact is, when an authoritative decision was made in the Department of Defense—

Senator PRESSLER. On Friday, last Friday—

Mr. PERLE [continuing]. That is correct as to who would testify, I received the happy task of coming before you today.

Senator PRESSLER. But you were a replacement for T. K. Jones.

Senator CRANSTON. Mr. Chairman, I mean no disrespect for the witnesses. I know it is inconvenient for them. I thank them for coming. I would like to hear from them under appropriate circumstances, but I don't think we should proceed in this way now. I move that we proceed with the next witnesses.

Senator PRESSLER. I will accept that motion. I mean no disrespect either, and I have worked very closely with the Pentagon and will continue to do so. We will have to try to reschedule this with some kind of understanding. We will go to the public witnesses at this time. I cannot, under the circumstances, go forward, so I thank you very much for coming, and look forward to hearing from you. I request that you give me a letter when we can hear from T. K. Jones, and I will take it up with the full committee this afternoon, or as soon as possible, as to what our next step will be.

I will now call our public witnesses. They are Dr. Eugene Wigner, professor of physics at Princeton University; Mr. Spurgeon M. Keeny, Jr., scholar-in-residence at the National Academy of Sciences, and former Deputy Director of the Arms Control and Disarmament Agency, and Adm. Noel Gayler, former commander-in-chief, U.S. Forces, Pacific, and Director, National Security Agency.

Would you all please come to the witness table?

[Pause.]

Senator PRESSLER. Dr. Wigner, you may proceed.

STATEMENT OF EUGENE P. WIGNER, PROFESSOR OF PHYSICS,
PRINCETON UNIVERSITY, PRINCETON, N.J.

Mr. WIGNER. Thank you.

I am very depressed by what I have heard.

I think there is a great deal of misunderstanding on the role of civil defense. Surely, the world would not be any better if we had no civil defense. It would be very much worse.

But what I am most afraid of is not a war, but it is a new Munich, that the Russians would evacuate their cities, put their city defenses into effect, and then threaten us. And, while I don't know what they would demand, but it may be something like that unless we dismantle our Air Force, tomorrow 60 percent of our people will die.

That would be a terrible threat, and I don't know what our President would do were he confronted with such a threat.

Our retaliatory power is very much decreased by the Russian civil defense. When it is said that this is not true, then one is mistaken. An accurate calculation indicates that if they put their evacuation scheme into full effect and if they use their shelters, even if we re-target our missiles, the total loss of population that we could cause would be between 3.5 and 4 percent—I repeat, between 3.5 and 4 percent—and this contrasts with the loss which they could cause to us if we had no evacuation, and that is 60 percent.

This is a terrible situation.

It has been pointed out that a nuclear war would be terrible. Yes, it would be terrible. But is this a reason against civil defense? It is a reason for civil defense, because certainly civil defense does not make it more terrible. In fact, it very likely helps to avoid a confrontation. As the Swiss say of the Swiss civil defense, the greatest advantage of civil defense is that it will never have to be used.

The other thing that depresses me is the fact that the Russians have a civil defense, and if this is evil, they should be criticized. Nobody criticizes the Russians for having a civil defense. I will not criticize them either. I think it is the right thing. If terrible offensive weapons exist, we should develop defensive weapons also, and reduce their effectiveness. Certainly a world in which neither side can destroy the other is better than a world in which each side can destroy the other.

Even if it were true that we could still destroy the Russians, which is not true at all, the mere fact that they say that it is not true and that they believe that it is not true enables them to make a new Munich to threaten us and to push us around. Nobody has discussed, no opponent of civil defense has discussed, the question of what should we do if the Russians put their civil defense into effect and threaten us. They could create a new Munich.

The other thing that depresses me—and I am very depressed, I must admit—is the communique of the Federation of American Scientists [FAS], which was distributed here and which I have just read. It has about 10 points and, in my opinion, each of them is meaningless.

It says that the Soviet evacuation program is no danger because it would not embolden the Soviets, when, in fact, even a major Soviet program would not suffice to insure Soviet survival.

First of all, it could assure Soviet survival. But, even if it did not, it would embolden them. Even if it were not true—though it is true—

they could pretend that they believe that it is effective. And, in fact, it is effective.

The FAS second point says that our evacuation program would not match and neutralize a Soviet evacuation plan but, in fact, it would give it credibility.

Well, it has credibility for the Russians, anyway. As you know, they teach civil defense and the problems of evacuation and its effects in grade school, in high school, and in every factory. They are prepared for it fully.

The third point of the FAS communique says that our citizens would not be willing and able to leave their homes for "host areas" in a crisis.

I remember that before World War II, the British in England said the same thing about people going into shelters. But, when the war came, and it was proclaimed that they should go into shelters, practically everybody went into shelters.

Let me not go through the rest of the communique because it is just as meaningless as the first few points.

Nobody told me what our President should do if the Russians evacuate their cities and threaten us. If we can evacuate our cities and if we have plans for that and can do it, perhaps not as well as the Russians, but well enough, it would reduce our casualties from 60 percent to about 10 percent. The reason for our lesser effectiveness is, first of all, that a larger fraction of our population lives in big cities. Second, many of our big cities are bordered by water and they are close to each other, so evacuation is not so easy.

To reduce the losses from 60 percent to 10 percent is still a major accomplishment. I think they are right, those who say there also should be shelters. With that we could reduce the population loss very significantly. According to estimates made not by me, but by others, it would reduce it to about 5 percent. This would make it possible for us to resist a new threat on the part of the Russians, and we could avoid a new Munich. Freedom in this world would not be abolished.

But nobody told us what our President should do if the Russians put their civil defense into effect and threaten us with something which would destroy our hope in the future, which would destroy our independence, and which would put us into a similar position as was Czechoslovakia after Munich.

This is what bothers me, and I am very depressed, as I said, by what I have heard.

Thank you for the opportunity to say this.

[Dr. Wigner's prepared statement follows:]

PREPARED STATEMENT OF DR. EUGENE P. WIGNER

A CASE FOR CIVIL DEFENSE

It has become widely recognized that the Soviet Union has superiority over the United States in many important measures of military strength. Warsaw Pact forces in Europe outnumber NATO forces three to one in tanks, and almost two to one in manpower and aircraft. In strategic nuclear weapons, the Soviet Union surpasses the United States by factors of 2 to 1 in megatons and 3 to 2 in payload weight. These disparities have become widely recognized by most observers in the United States. We are rightly embarked on a multibillion dollar effort to correct them over the next several years.

But the greatest disparity in strength of the two countries is in the vulnerability of their civilian population to strategic attack. This disparity is greater

than 10 to 1 in favor of the Soviet Union. If there were a full nuclear exchange in the near future after a few days' crisis, fatalities in the Soviet Union could be between 3 and 5 percent—less than their casualties in World War II. In the United States, fatalities could be 60 percent. The Soviet Union has been able to accomplish this dramatic reduction in the vulnerability of its population by a well-thought-out plan developed and implemented over the past two decades. Their plan encompasses evacuation of their urban population and construction of expedient fallout shelters for them in the surrounding host areas. They have constructed blast shelter for most of their critical workers who must keep military production going during an emergency. In addition, they have an unknown amount of blast shelter in some of their cities for up to possibly 50 percent of their population. They have developed expedient protection methods for their critical industries. They have established a strategic food reserve containing approximately a year's supply of grain. They have continuing training programs to educate all of their workers and school children on the nature of nuclear war and the means that can be taken to survive it.

The Soviets' objective, which they have stated repeatedly, is world domination. In the words of their anthem, "The Soviet international shall be the human race." Their actions in Eastern Europe, Afghanistan, Laos, Cuba, Angola, and Ethiopia should leave little doubt in anyone's mind about the determination behind their words.

Suppose one of their foreign adventures resulted in a confrontation with the West, for example, in Europe or the Persian Gulf. Suppose the crisis escalated, perhaps with conventional military clashes until the Soviets evacuated the cities. In what position would the President of the United States be in such a situation? How would he respond to a threat of a nuclear exchange? What pressures would be on him when 130 million Americans are facing immediate risk of annihilation? What leverage would he have over the Soviet Union, if he were able to threaten fewer of their population than they lost in World War II?

The Soviet Union does not want war, even one they know they can recover from. They want the fruits of victory without the war; a new Munich. The universal perception of their nuclear superiority and invulnerability cannot be other than a temptation to the Soviet Union to take longer risks of confrontation in pursuit of their goals, and this is dangerous. Confrontations can get out of hand and can escalate into a war that nobody wants.

What must we do?

We must proceed with the Federal Emergency Management Agency's crisis relocation planning (CPR) in order to develop a counterevacuation capability that would give the American President a response to a Soviet evacuation other than "a choice between humiliation or holocaust." We must be able to reduce the vulnerability of the American people to a level comparable to that of the Soviet people. We must remove this temptation for nuclear blackmail. This can be done more quickly and at less cost than any of the proposed improvements in our strategic offensive systems. We should see significant improvements in the U.S. defense posture over 2 to 5 years at an annual cost of one-tenth of 1 percent of the Department of Defense budget, or approximately 1 percent of the cost of the proposed budget for enhanced strategic systems.

Then we must begin to build a strategic food reserve in host areas in conjunction with crisis relocation planning. This reserve will alleviate worries on the part of the host population about food supply in the event of an extended war. We must develop a program of incentives for incorporating shelter in new construction to reduce the dependence of our civil defense system on several days strategic warning.

And last but not least, we should develop a program of civil defense education of the population starting with high school students. Americans should be taught to protect themselves against the effects of nuclear weapons at least as well as the Soviet population. Education in the effects of nuclear weapons and defensive measures should promote informed political decisions. In democracies, it is the duty of government to keep people informed so they can make the right decisions.

It has been argued that educating the American people in the real effects of nuclear war and the means to survive it would make war more acceptable. Nothing could be further from the truth. My experience, and that of my coworkers, has been that the more we learn about nuclear war, the more determined we are to prevent it.

Our national policy must be to prevent nuclear war and simultaneously prevent the loss of American freedom through nuclear blackmail. This policy can

only be accomplished by deterrence. We believe the ultimate deterrent to war against the United States by any tyrannical power is the prospect of the survival of the American nation and its example of freedom.

Senator PRESSLER. Thank you very much.

I think we will hear from our other public witnesses at this time.

We will now hear from Mr. Spurgeon M. Keeny, Jr., scholar in residence at the National Academy of Sciences, and former Deputy Director of the Arms Control and Disarmament Agency.

[Mr. Keeny's biographical data follows:]

BIOGRAPHICAL DATA OF SPURGEON M. KEENY, JR.

PRESENT POSITION

Scholar-in-Residence, National Academy of Sciences, 1981- ; Member, Committee on International Security and Arms Control.

PREVIOUS EXPERIENCE

U.S. Arms Control and Disarmament Agency, Deputy Director, 1977-1981. Chairman, U.S. Delegation to U.S./Soviet talks on theater nuclear forces, 1980.

The Mitre Corporation, Director of Policy and Program Development, 1973-77. Responsible for planning in the areas of corporate policy and future work development. During this period, other activities include:

Chairman, Nuclear Energy Policy Study Group, sponsored by Ford Foundation, 1975-1977; released report, "Nuclear Power Issues and Choices", March 1977.

Vice Chairman, Committee on Environmental Decision Making, National Academy of Sciences, 1975-1977.

Member, American Physical Society Study Group on Light-Water Reactor Safety, 1974-75.

Member, Nuclear Effects Panel, Office of Technology Assessment, 1975-76.

U.S. Arms Control and Disarmament Agency, Assistant Director (Science and Technology), 1969-1973. Responsible for ACDA activities in support of SALT I and for technical aspects of other arms control activities.

National Security Council, Senior Staff Member, 1963-1969 (under Messrs. McGeorge Bundy, Walt Rostow, and Dr. Henry Kissinger); and concurrently

Office of Science and Technology, Technical Assistant to the President's Science Advisor, 1958-1969 (under Drs. James Killian, George Kistiakowsky, Jerome Wiesner, Donald Hornig and Lee DuBridge). In this dual capacity, responsible for work dealing with military programs, technical intelligence, arms control and disarmament, and atomic energy.

Executive Office of the President, Member, Security Resources Panel (Gaither Committee), 1957.

Office of the Assistant Secretary of Defense (Research and Engineering). Chief, Atomic Energy Division, 1956-57.

Joint Congressional Committee on Atomic Energy, Staff Member, Panel on Peaceful Uses of Atomic Energy, 1955-1956.

Headquarters, USAF, Chief, Special Weapons Section, Directorate of Intelligence, 1950-1955. Responsible for study of foreign atomic energy programs.

Military—Headquarters, USAF, Directorate of Intelligence, 1st. Lt., 1948-1950.

EDUCATION

Columbia University, B.A., 1944; M.A., Physics, 1946.

School of International Affairs and Russian Institute, Columbia University, 1946-47.

PERSONAL

Born—October 24, 1924, New York, New York; married, three children.

HONORS AND PROFESSIONAL SOCIETIES

Phi Beta Kappa; American Physical Society; Fellow, American Academy of Arts and Sciences; Rockefeller Public Service Award, 1970; Member, Council on Foreign Relations.

STATEMENT OF SPURGEON M. KEENY, JR., SCHOLAR IN RESIDENCE,
NATIONAL ACADEMY OF SCIENCES, AND FORMER DEPUTY DIRECTOR,
ARMS CONTROL AND DISARMAMENT AGENCY

Mr. KEENY. Mr. Chairman, I am pleased to appear before this committee as a private citizen in response to your request.

The debate over the value and role of civil defense has been going on with occasional public prominence for the last 25 years. During this period, I happen to have been involved in several of the key studies and actions starting with the Gaither study under President Eisenhower in 1957, and including the extended debate on the subject under President Kennedy. Most recently, as Deputy Director of the U.S. Arms Control and Disarmament Agency [ACDA] under President Carter, I participated in yet another review of the problem, and initiated with ACDA an extensive analysis of the impact of civil defense on the overall United States-Soviet strategic balance.

At the outset, I want to make clear that I believe an effective civil defense program might save lives in a nuclear war. Estimates as to the amount of protection actually provided vary markedly, depending on the nature of the programs and the many assumptions involved in such calculations, but I know of no study by any department of Government over this entire period that would support the incredible claims concerning civil defense allegedly made recently by senior officials in the present administration.

I refer in particular to the widely reported statements of Mr. T. K. Jones, to which the committee already has referred, to the effect that with proper civil defense it would take only 2 to 4 years for the United States to fully recover from an all-out nuclear war with the Soviet Union. In the same vein, the Los Angeles Times quotes FEMA as declaring, "The United States could survive nuclear attack and go on to recovery in a relatively few years."

Such statements are a cruel hoax on the American people, but far more frightening is the possibility that such absurd assessments might be taken seriously by senior policymakers. The reassuring notion that the Nation could somehow quickly recover from an all-out nuclear war could encourage policies and actions which could in fact result in the complete destruction of our society, if not civilization as we know it.

In order to explain my amazement and outrage at these totally misleading assertions as to the consequences of nuclear war, I would like to report some of the results of the ACDA study on the subject. The ACDA study is particularly relevant since it examined in detail the effectiveness of an idealized Soviet civil defense system employing massive urban evacuation and blast shelters for leadership and key industrial personnel. As I understand it, this essentially is the civil defense approach that Mr. Jones and FEMA officials have in mind in their optimistic assessments of rapid recuperation for the United States.

Before reviewing the ACDA findings, I would like to note that the assumptions in the study were in general very favorable to civil defense, and the calculated fatalities were considerably less than those in a DOD study conducted at about the same time.

The ACDA study assessed the immediate impact on Soviet society of a U.S. retaliatory strike with surviving forces against Soviet military and industrial targets after a Soviet first strike against U.S. military and industrial targets. As a base case, the study calculated that if the Soviets did not evacuate their cities, but simply utilized the best available shelter, the U.S. retaliatory strike with forces on normal day-to-day alert would result in some 60 million Soviet fatalities from the immediate short-term effects, and if Soviet forces were on generated alert, Soviet fatalities would be over 80 million.

Now, if the Soviets were able to evacuate successfully 80 percent of the urban population and provide the best available shelters for the remaining 20 percent with the same targeting philosophy there would be 25 to 35 million Soviet fatalities from U.S. forces that would certainly be on fully generated alert in response to the highly visible Soviet mass evacuation, but the retaliatory force would always have the option to increase the fatality rate substantially by modifying targeting practices.

For example, if the United States were to respond to this Soviet civil defense strategy by ground-bursting instead of air-bursting nuclear weapons, thereby creating much higher levels of local fallout, there would be 40 to 50 million Soviet casualties. If, in addition, the United States were to retarget some of the weapons designated for military targets or use some of the 10- to 15-percent reserve against the evacuated population, there could be 70 to 85 million Soviet fatalities.

The study also investigated the physical condition of the Soviet Union after the attack. By virtue of the colocation of industrial and military targets with urban areas, all of the 200 largest Soviet cities and 80 percent of 886 Soviet cities above 25,000 people were attacked, 85 to 90 percent of the housing in these cities was destroyed.

The study also showed that 85 to 90 percent of important Soviet production capacity would be destroyed in a retaliatory strike by a fully generated U.S. force. An important finding was that almost as high a percentage of secondary untargeted industry would also be destroyed, since it was largely collocated in urban areas with the targeted facilities.

In addition, the cities would be covered with intense fallout, initially producing doses of radiation of from 5,000 to 30,000 roentgens, immense numbers in view of the fact that 450 roentgens produces a 50-percent chance of fatality. While the intensity of this radiation would fall off with time, it would still be months before one could work continuously in these areas to start the rebuilding process.

While the ACDA study focused primarily on the Soviet civil defense program, the size and significance of which was and is, as you know, a subject of much debate, the study also examined the utility for the United States of a similar program as is apparently now being proposed. The results showed that with a comparable program, the U.S. fatalities would be considerably higher than the Soviets' since it was assumed that the Soviet Union would strike first, and the higher yield of Soviet weapons would produce more fallout.

This catastrophic picture of post-attack United States and Soviet society even with extensive civil defense preparations is based only on the immediate and direct consequences to life and property, and does not take into account the very substantial, but difficult to quan-

tify, intermediate and long-term effects that would certainly seriously compound the extent of the disaster.

It is clear that a real estimate of the true extent of the resulting fatalities and of the ability of society to regenerate itself would also have to take into account such important intermediate effects as:

One, the fate of tens of millions of serious trauma and burn casualties in a chaotic environment in which most medical facilities would either be destroyed or inaccessible to the victims.

Two, the ability of survivors to remain for weeks or even months in congested shelters without proper food, water, or sanitation in order to avoid excessive radiation exposure.

Three, the impact of disease and epidemics on a weakened population jammed together in unsanitary conditions with, at best, inadequate food, water, and medical support.

In addition to this, the ultimate impact of such a nuclear exchange also involves longer term effects, about which little can be said quantitatively, but which would certainly increase the impact of the disaster and complicate efforts to rebuild society.

One, the enormous destruction of livestock and the radioactive contamination of food-growing areas. Two, the effect on life expectancy and effectiveness of the surviving population which had been subjected to high but not lethal levels of radiation exposure. Three, the possible long-term consequences on the entire environment resulting from the destruction of the ozone layer that filters out harmful ultraviolet radiation, and finally, the possible unknown synergistic effects of such a catastrophic event on society and the ecological system as a whole.

The cumulative impact of these incalculable intermediate and long-term post-attack problems was assessed by the Congressional Office of Technology Assessment in its 1979 study, "The Effects of Nuclear War," as follows:

The effects of a nuclear war that cannot be calculated are at least as important as those for which calculations are attempted.

Where, then, do Mr. Jones and his possible supporters in FEMA come up with their remarkable assertions that things would be back to normal in 2 to 4 years? In the mid-1970's, as an employee of Boeing, Mr. Jones undertook a series of studies on civil defense involving urban evacuation in which the evacuees would build their own expedient fallout shelters with the shovels to which he refers, and on the general problem of industrial hardening.

In these studies, Mr. Jones concluded that there would only be 5 to 10 million Soviet fatalities in a full-scale United States retaliatory strike, and that the Soviet Union could recover within "no more than 2 to 4 years." Mr. Jones's findings were so different from all others that ACDA made a concerted effort to understand his methodology. As I explained in congressional testimony at the time, his analysis of the level of fatalities was so fatally flawed in so many ways that it should not be taken seriously.

Now, with regard to the recent claims of U.S. recovery in 2 to 4 years, Mr. Jones has long advocated emergency hardening of key equipment and dispersal of industry. While it is certainly possible to protect a machine tool or even a more delicate piece of machinery,

properly packaged, from blast by burying it in dirt, to suggest that the Soviet Union or the United States could protect their entire industrial base, including such facilities as oil refineries and chemical plants in this manner or short notice is truly incredible. Attempts at large-scale direct hardening would be extremely costly and of marginal utility because of the destructive capacity of modern nuclear weapons. Serious attempts at hardening would invite the detonation of accurate weapons at lower altitudes, creating higher overpressures. There is no evidence that the Soviet Union is pursuing such a hardening program.

With respect to industrial dispersal, this is an extremely expensive, long-term undertaking that can be easily overcome by retargeting existing weapons. In the case of the Soviet Union, the evidence is that on balance their industrial resources are becoming more centralized as new and modernized plants are built in existing urban centers.

But whatever the number of survivors that eventually emerge from the shelters, and I for one think that all studies underestimate the ultimate number of fatalities, the notion that they will rush to rebuild the radioactive debris of the cities is truly fantastic. Society would be absorbed with the mere problem of caring for the dying and surviving one day at a time. With little hope of any help from other parts of the country or its allies and friends, most of whom probably also would be in ruins, the capabilities of society will be fully stretched to distribute supplies to sustain the survivors. It would probably take 2 to 4 years simply to understand the full extent of the catastrophe and to determine whether American society as we know it would continue to exist.

In conclusion, I think the Chairman of the Joint Chiefs of Staff, Gen. David Jones, gave the best short summary of the results of an all-out nuclear exchange when he stated before this committee on November 3 of last year:

Clearly, the casualties in the northern hemisphere would be under the worst conditions into the hundreds of millions of fatalities. It is not that there would be no life remaining in the northern hemisphere, but if all the weapons on both sides were targeted in such a way as to give maximum damage to urban and industrial areas, that would be the greatest catastrophe in history by many orders of magnitude.

Thank you.

Senator PRESSLER. Thank you very much.

Mr. WIGNER. May I make a rebuttal for a brief time?

Senator PRESSLER. No, you may not, not at this time. We have a question and answer period following later. We hear from each of our witnesses, and then we have questions and answers. We have one more witness to hear from, and that is Admiral Gayler.

Admiral, please proceed.

STATEMENT OF ADM. NOEL GAYLER, FORMER COMMANDER IN CHIEF, U.S. FORCES, PACIFIC, FORMER DIRECTOR, NATIONAL SECURITY AGENCY, AND FORMER DEPUTY DIRECTOR, JOINT STRATEGIC TARGET PLANNING STAFF

Admiral GAYLER. My name is Noel Gayler. Before my retirement, I had served 45 years in the naval service and in three wars. I was for many years a carrier fighter pilot and an experimental test pilot. I

have commanded major ships and task forces at sea. I have served as commander in chief of all U.S. forces in the Pacific, as Director of the National Security Agency, and as Deputy Director of the Joint Strategic Target Planning Staff, responsible for national strategic targeting.

Since my retirement, I have served as a member or adviser to a variety of think tanks, laboratories, and Government agencies responsive to security requirements. I am reasonably familiar with current and proposed modern military technology, including nuclear, conventional, and space.

More to the point, I saw Hiroshima 6 days after it was hit, I participated in the second series of Pacific bomb tests, I did much of the early development work on delivery of nuclear weapons by naval aircraft, I was largely responsible for nuclear target planning, and as CINPAC I was one of the executing commanders. Since that time, I have devoted much study to the theory and the practice of national security.

There is a common rationale given for civil defense programs. These issues have been before us for a long time, certainly since 1949. Proponents generally suggest certain arguments. In each case I believe they are mistaken. The most commonly held notions are: One, that it will save lives. I believe that it will not, and may, in fact, cost lives. In a moment, I will discuss why this is so.

Two is that it will put the United States in a less vulnerable position. I believe that it cannot put the United States in a less vulnerable position, and may, in fact, put us in a more vulnerable position. I will expand on this in a moment.

Three is that it will serve as a deterrent to attack, and therefore reduce the chance of nuclear war. I think, on the contrary, it invites attack from an opponent at a time of his choosing. More on this in a moment.

Four is that it will lead to a faster economic recovery after a major nuclear exchange. When half the Nation is dead and the other half injured and sick, it borders on the theater of the absurd to believe that we would worry about heavy metal forming presses or other industrial equipment.

Five is that we have to match whatever the Russians do. That is another argument. They make mistakes, too, and their civil defense program is a turkey. Many of them are beginning to realize that.

Fundamentally, what is wrong with civil defense? It won't work against nuclear attack. There are not only enough nuclear warheads for direct hits on every military target, every city or village, but also for every relocation area in the United States or the U.S.S.R., and if the opponents should think they are not enough, he has only to build more.

Deep shelters would become deep tombs. Fallout shelters are impracticable. How long can you and your family live under two doors covered with 3 feet of earth? How do you dig around New York or Chicago or Moscow in the frozen ground of winter?

Evacuation of major cities in any reasonable length of time is impracticable. It would invite attack during evacuation, like ants under a log that has been overturned. That would be the time to attack if

somebody wished to do that, actually increasing the casualties. Any evacuation area can itself be targeted if an opponent wishes to do so.

What is wrong with civil defense? It is bad policy. Just as we regard Russian civil defense posturing as threatening evidence of preparation for nuclear attack, so do they regard ours, feeble though it may be. In this way, it generates a mind-set toward nuclear war. Our civil defense programs will generate requirements for even more Russian warheads, just as Russian civil defense generates requirements for more of ours.

It is wasteful. With the best intentions in the world, every civil defense program we have ever had, however well administered, has turned out to be a fiasco. This program would also. There is no need to match the Russians. General Altunin or no General Altunin, qualified Russian observers concede that Russian civil defense is a phony, a Potemkin Village.

Civil defense has no military utility. We have real military needs that are not now being met. Neither more nuclear weapons nor civil defense meets these needs in any way. These proposals do not belong in a military program. Whether they are a sensible way to spend other money compared to schools and other social needs I leave to your judgment.

It is dangerous illusion. I have no confidence in the imaginary situations and chess games that a certain school of analysts dreams up. Real war is not like these complicated tit-for-tat imaginings. There is little knowledge of what is going on, and less communication. There is blood and terror and agony, and these theorists propose to deal with a war a thousand times more terrible than any we have ever seen in some bloodless analytic fashion. I say that is nonsense. We deceive ourselves, and we deceive our opponent into believing we have aggressive intentions that we do not have.

Finally, it makes no economic sense. For the Government or for corporations to spend a lot of money on expensive shelter programs in these tough financial times is senseless.

In my judgment, the only way to save American lives is to drive down the probability of nuclear war.

Thank you, Senator.

Senator PRESSLER. Thank you very much.

I shall now ask some questions. Then I will yield to Senator Cranston. Then we will come back for a second round.

First of all, one thing that is very intriguing to me is the burial of the dead. At first, that sounds like a rather macabre subject, but with the number of deaths that we have been told might occur, there would be the problem of disease and so on. Are there plans in our civil defense for mass graves or for burial? Presumably, if everybody was going out into the countryside and digging a shelter, what would become of the people whose bodies were not burned in the direct hit? We are told many people would die from the atmospheric results. Based on the studies that you have seen, and I will start with Mr. Keeny and go across the table, are there plans for burial of the dead in either the Soviet or United States plans?

Mr. KEENY. I have no idea what plans either the United States or the Soviet Union has on the burial of the dead. I would comment that quite

a few of the dead will automatically be buried in their shelters, because many of the so-called blast shelters and fallout shelters in areas under attack will be subject to firestorms, major conflagrations, and will be covered with debris and will also probably not have the advertised blast resistance. So, there will be a large component of the population that will have automatic burial.

As to those in the open, I cannot advise you on that.

Senator PRESSLER. When you were at ACDA in 1978, I think you oversaw preparation of a study on the effect of nuclear war in the Soviet Union. Did you ever get into that subject, the burial of the dead, there?

Mr. KEENY. The subject is always brought up, but I do not know the resolution. Clearly, you are correct. It is a major problem, to have millions of bodies exposed. That would be just one more of the many factors compounding the postattack health problems.

Senator PRESSLER. Admiral Gayler, do you have comment?

Admiral GAYLER. I have no special knowledge of any burial program. I have not seen it addressed in any of the proposals that I know of.

Senator PRESSLER. Is it something that we should have?

Admiral GAYLER. I think we should have every means we can to reduce the probability of nuclear war, and that we should not delude ourselves into thinking that some civil defense program is going to significantly improve the chances of any fraction of the Americans of surviving. That is what I think.

Senator PRESSLER. So you are saying that maybe we should not have a civil defense program, that the threat of nuclear war and the damage is so great that it is futile?

Admiral GAYLER. I think we should not have one addressed to nuclear war. I think that the emergency preparedness plans having to do with natural disasters and evacuation of cities after earthquakes and so forth are very valuable things, but they should be designed for that purpose.

I noticed that in the money requests that are put forward, the great preponderance of the effort has to do with such things as radiological surveys and preplanned evacuation, which are of no direct help in natural disasters. In a natural disaster, there would be help from outside, and organizing that help is the major thrust of what can be done. In a nuclear attack, there would be no outside, and no help available.

So, my answer to your question is, I think there should be an emergency preparedness program, but that it should not relate to the purported defense against nuclear attack.

Senator PRESSLER. Dr. Wigner?

Mr. WIGNER. Let me remind you that neither of the two opponents of civil defense has discussed the question what our President should do if the Russians evacuate their cities and threaten us. This is a danger, and we should face it and not forget it.

The other thing is that we are accused that if we have civil defense then we have aggressive intentions. The Russians are not so accused, and that the Russians do not believe in our aggressive intentions is best documented by the statement of Kosygin. He said, "Do not forget; if I offer my embrace, you will not refuse it."

The last problem which was mentioned by opponents of civil defense is that we are in a tough economic situation, and that we should not spend money on civil defense. The gross national product per person in Russia is one half of ours. Their civil defense expenditure is even now, after ours has been increased by a factor of two, eight times greater than ours. They spend about \$2 billion a year, and we are supposed to spend about \$250 million.

Are the Russians crazy to do that? Are they? What is it that they do? Are they wicked as we would be wicked if we did this? No. We want to defend the people, and we can and should defend them.

The last point I want to make is that it was said that in addition to the primary effects of the nuclear weapons, the fallout would create radioactivity. Of course if the explosion is on the ground, this is true, but then the other effects of the nuclear weapons would be decreased by almost a factor of two, the blast pressure and the heat spread, so we should not forget these facts.

All together, the principal advantage of civil defense is not that it would make the world less terrible. It would make it less terrible, but the principal effect would be that it would reduce the probability of a war. Thank you.

Senator PRESSLER. Dr. Wigner, I know that you speak frequently in public gatherings on the question of civil defense. Are you confident that the American people could execute a mass evacuation without panic or disorder?

Mr. WIGNER. I think so. The people in London, as I mentioned, went into their shelters without a panic. I discussed the effect of the shelters of the people, how they behaved in the shelters, and was told that the worst thing that happened was that somebody said to somebody else, "Go to hell." Of course, that is not a nice thing to say, but just the same, worse things happen in this world than to tell somebody else, go to hell.

But in addition to that, I agree, that it would be even better to build good shelters. The Russians are prepared to build shelters after evacuation, and we tried out their plans at the Oak Ridge National Laboratory. We used the Russian civil defense handbook which was distributed in the U.S.S.R. in 200,000 copies. We had it translated and passed it out to the people around Oak Ridge; we asked them to effectuate it. Some asked questions, but we refused to answer the questions.

Just the same, with two exceptions, everybody was ready in less than 36 hours having constructed the shelter that was described in the Russian civil defense handbook. It was tried out in practice and the blast resistance was a good deal more than 30 pounds per square inch. So I think much of the criticism is not valid.

My criticism is, that we do not know what the President should do if the Russians evacuate their cities and put civil defense into effect, and threaten us that unless we dismantle our Air Force or unless we return Alaska or something like that, they kill most of our people. What should the President do? What should the President do?

Senator PRESSLER. My final question to all three of you before I yield to Senator Cranston is this. Do you believe the American public supports augmented spending on civil defense, and to what levels of expenditure?

Mr. WIGNER. It is very difficult to answer this question but I am convinced it does. Perhaps I mentioned this. We have a summer home in Vermont, and the people asked me to speak about civil defense. After I spoke, they instituted a very good shelter in their church. It is unpleasant to know that civil defense is necessary, very unpleasant, as it is unpleasant to know that we will all die. That, too, is very unpleasant, but we adjust to it, and if people know that civil defense is needed, they will accept it, and will conform to the necessity.

Senator PRESSLER. Well, maybe you can escape somewhere, but you see, in my own case, I am from the State of South Dakota, a principal target because of the Minuteman bases, and also here, I live four blocks from the White House. The two places that I live are principal targets.

Admiral, do you have a response?

Admiral GAYLER. Your last question has to do with the degree of national support, Senator. I think it is quite extraordinary, Senator, that for example in Colorado, where I live, Boulder has just voted down any support for civil defense moneys. They, too, are in presumptive target areas.

If I may, and if it would be appropriate, I would like to answer Dr. Wigner's question as to what the President does. I already have said that I have no confidence in these chess games in which move A, move B, move C, and move D go, but taking it at the chess game level, entirely apart from the morality of it, I think the President clearly has the option to retarget our forces, and we have many forces that are targeted in a rather sterile effort to knock out Russian silos. He would in fact retarget, or perhaps he need only say that he had retargeted those nuclear attack forces to accomplish more Russian fatalities and inform the Russian premier that he had done that.

Mr. WIGNER. The calculation assumes that it is retargeted.

Admiral GAYLER. We can only testify one at a time, Dr. Wigner.

Mr. WIGNER. But we should testify correctly.

Senator PRESSLER. Would you please let the Admiral proceed?

Admiral GAYLER. The suggestion that \$250 million is not much compared to the Russian effort is accurate, but I suggest we should also look at the out years. It would surprise me very much if the requests didn't go up if this \$250 million were approved.

So far as the question about, why are the Russians doing it, the Russians do make mistakes, and they do make major mistakes. I think that rather authoritative Russian scientific people and military people have all but admitted that this program of theirs is a mistake in the sense that it cannot protect the Soviet Union. I cite particularly Marshall Ustinov, the Soviet minister of defense, who said on the 9th of November, approximately, the American idea that we Soviets believe we can defend the Soviet Union against nuclear attack is a lie. There are many other citations of that kind.

Finally, as to improving the deep shelters, I don't think there is anything proposed that we do that because the idea falls of its own weight. I just would like to have you notice that nobody thinks Cheyenne Mountain is impregnable, and I doubt if deep shelters are going to be much better than that.

Senator PRESSLER. Thank you.

Mr. Keeny?

Mr. KEENY. I think that you are clearly in a better position than I am to judge public reaction to a substantially expanded civil defense program which, I think, if it becomes a serious program, will certainly come to the billion dollar levels before very long.

I would like to underscore what Admiral Gayler has just said on the question of what do we do when blackmailed. The President has lots of options. One thing that would immediately happen if the Soviets evacuated their cities and made any demands would be that the President would place all of our nuclear forces on full generated alert, which means that the Soviets would have to face a much larger force than they would on a day-to-day situation. In addition, as I noted in my earlier testimony, the Soviets, who are quite aware of all these things, know that by retargeting weapons, as the Admiral suggested, we could drive up their fatalities to 75 or 80 million by targeting relocation areas.

In addition to that, whether they evacuate or not, their cities, their industry, their entire culture will be equally vulnerable, and this would provide the same deterrence as existed in the absence of evacuation. I would believe, therefore, that a President should make clear that we would stand firm, and that the basic deterrent posture would be just as effective in those circumstances.

Senator PRESSLER. Thank you. That concludes my questions. I shall now call on Senator Cranston and Senator Pell.

I would like to remind the interested parties that we will have another hearing following this hearing on the ACDA nominees. So if those nominees would please remain, we will try to hear them immediately after this hearing. There are three nominees for ACDA who we will try to hear this morning before we conclude.

Senator Cranston.

Senator CRANSTON. Mr. Wigner, what is your relationship with the Federal Emergency Management Agency?

Mr. WIGNER. They have invited me to several conferences. They even asked me to be the chairman of an advisory committee, but I have no other relation to them.

Senator CRANSTON. Are you in part then a public witness and in part an administration spokesman?

Mr. WIGNER. No, I am not an administration spokesman.

Senator CRANSTON. Have you advised White House officials on civilian defense?

Mr. WIGNER. I don't know any White House official. I have spoken with many people, and I have written papers on it. In that way, I have advised everybody about the necessity and importance of civil defense, even though I do admit that it is unpleasant to know, but in a democracy we have the duty to inform the people, even of unpleasant facts, because they make the decisions, and they should make the decisions on the basis of the knowledge of the actual facts.

Senator CRANSTON. Then you have not specifically discussed your views of civilian defense with anyone in the White House?

Mr. WIGNER. You know, I think I once made a visit to somebody in the White House, but I am not sure. Certainly not with the last administration.

Senator CRANSTON. Thank you very much.

Mr. Keeny, as Deputy Director of ACDA in 1978, you oversaw the preparation of a thorough study of the effects of nuclear war on the Soviet Union. On the basis of that study, do you believe that the Soviet civil defense system would ever cause them to believe that they could risk nuclear war without suffering catastrophic consequences?

Mr. KEENY. No. I believe it is very clear that the consequences of nuclear war, even if their civil defense system worked much more effectively than it is reasonable to expect it would, would be so severe that it would not give them a basis for initiating nuclear war with the thought that they would survive as an effective, viable society.

Senator CRANSTON. And you assume that they are well aware of those dangers?

Mr. KEENY. It is very hard for me to know what goes on inside the minds of all the Soviet officials, but it seems to me the case is quite obvious, and I do know that some Soviets seem to be quite aware of the limitations of their civil defense program.

Senator CRANSTON. Thank you very much.

Admiral Gayler, as a long-time student of the Soviet military, what do you believe the Soviet Union intends to accomplish with the civilian defense effort that they have made, limited though it is?

Admiral GAYLER. I think it is a part of a strategy in which they perceive their total nuclear capability to stand ours off, and that underneath these two overarching capabilities all of the action takes place, and underneath it is the capability to overawe Poland, the capability to invade Afghanistan, the capability to dispose of Hungary as they did, and Czechoslovakia, and the Baltic States, and to conduct adventures around the world, as they are now doing in Cuba and possibly in Central America.

I think they recognize that it is the local capability that decides the issue, and that their political successes have depended essentially on military local capability for a great many years, since the bloom came off the Soviet Communist revolution.

The exception to this, of course, was in the Cuban missile crisis. There again, we actually had great nuclear superiority at that time, but we acted as if it were a standoff. Underneath that, the action took place. We had the horses, and we had our way. I think it is that simple.

I do believe, however, that the Soviets assign relatively little value to their civil defense program in improving their strategic position, although they have in the past continued to spend a lot of money on it and to make a lot of statements, and I base that on the statement of Marshall Ustinov that I just quoted, and on statements personally made by people such as Dr. Blohkin, the foremost practitioner of cancer research in the Soviet Union, the head of the Soviet Academy of Medicine, and of Dr. Innozemtsev, who is the head of their Economic Institute, and is purported to be a speech writer for Brezhnev, and from many statements which Brezhnev himself has made about the insanity of nuclear war, and its lack of political utility.

Senator CRANSTON. Do you believe that their civilian defense effort increases in any appreciable measure the possibility that they would be willing to engage in nuclear war?

Admiral GAYLER. No, sir.

Senator CRANSTON. I want to thank you very much for your testimony. Your background and experience makes you a particularly effective and helpful witness. I appreciate it very much.

Admiral GAYLER. Thank you, sir.

Senator CRANSTON. Thank you, Mr. Chairman.

Senator PRESSLER. Senator Pell.

Senator PELL. Thank you, but I have no questions.

Senator PRESSLER. Do you have a statement that you wish to have inserted in the record?

Senator PELL. Not at this time.

Senator CRANSTON. I have several articles that I would like to put into the record, two Los Angeles Times interviews with T. K. Jones, a Los Angeles Times editorial, and a San Jose Mercury editorial.

Senator PRESSLER. Without objection, it is so ordered.

[The material referred to follows:]

[From the Los Angeles Times, Jan. 15, 1982]

CIVIL DEFENSE PROGRAM TO BE REVIVED—REAGAN SEEKS TO COUNTER POSSIBLE ATTACK BY SOVIETS

(By Robert Scheer)

The Reagan Administration has decided to revive the nation's dormant civil defense program as part of its goal of attaining a "nuclear war-fighting capability" to counter the alleged threat of a Soviet nuclear attack.

The program adopted by the Administration, which would require substantial spending increases, claims to be able to save 80 percent of the American population in an all-out nuclear war with the Soviet Union.

In pushing for the program, President Reagan personally intervened to overrule his Office of Management and Budget staff and Air Force Gen. David C. Jones, chairman of the Joint Chiefs of Staff. OMB officials argued that the program had been planned hastily and could end up costing \$10 billion in the next five years. Jones believed the money could be better spent on other defense items.

FIRST STAGE: EVACUATION

The new civil defense program, which in its first stage involves planning for the evacuation of the urban population from U.S. cities to primitive, anti-radiation fallout shelters in the countryside, was drawn up by the Federal Emergency Management Agency (FEMA), an independent federal agency.

The agency's plan at first was stalled by OMB objections and by expected congressional opposition. But the agency's director, Louis O. Giuffrida, who formerly headed a California anti-terrorist school, contacted presidential counsel Edwin Meese III, who enlisted President Reagan's support.

Reagan, who long has favored an expanded civil defense program, responded at a Dec. 3 National Security Council meeting by committing his Administration to the first major increase in funding for the civil defense program in two decades. The President spoke in favor of the emergency management agency's request after Meese called it an essential part of the Administration's strategic policy goals.

HAIG BACKED PROPOSAL

Jones, head of the Joint Chiefs of Staff, was the only member of the National Security Council to oppose the proposal. Both Deputy Defense Secretary Frank C. Carlucci, who represented the Pentagon at the meeting, and Secretary of State Alexander M. Haig Jr. strongly supported the civil defense proposal.

While the President backed the emergency management agency's request "in principle," the specifics were left to subsequent meetings of Administration budget committees that included Meese and OMB Director David A. Stockman. At that stage, the OMB critics effectively attacked the cost figures in the agency's proposals as unrealistic.

In particular, the agency had not accounted for the effects of inflation in the program's future years, OMB officials complained. Nor had the FEMA factored in the future costs of such key items as the cost of real estate for blast shelters, which are hardened steel-and-concrete underground structures built to withstand the impact of a bomb.

"They were going to put blast shelters in Manhattan, one critic scoffed, and they just assumed that the cost of the land was insignificant."

The budgetary watchdogs succeeded in keeping the dollar commitment for fiscal 1983 to \$237 million, an increase of almost 90 percent over the current year, and stipulated that the larger sums requested for future years would be debated during this spring's review of the 1984 budget. One source deeply involved in the budget process predicted that the ultimate cost of the program "could easily go over \$10 billion if they end up going for blast shelters."

The commitment for fiscal year 1983 is to a part of the agency proposal, called Program D, which involves only speeded-up planning for the evacuation of American cities and towns before a nuclear attack. Program D was developed during the Carter Administration but never acted on. More costly elements of the program, such as the construction of urban blast shelters to protect "key industrial workers" and the hardening of industrial sites to withstand nuclear explosions, were left to the 1984 budget.

"This plan was just sitting on the shelf and they dusted it off when Reagan came in," said one OMB official.

The agency's description of its evacuation program claims that it will reduce U.S. fatalities to 20 percent in the event of an all-out nuclear war. As the proposal said, "Performance in a large-scale, mid-1980s attack would be on the order of 80 percent survival of the U.S. population, if the bulk of the risk-area population had been evacuated to host areas prior to attack, and if fallout protection had been developed and other crisis action taken."

The notion that this goal can be accomplished is at the heart of the difference between those in the Reagan Administration who believe that nuclear war is survivable and their critics, mostly outsiders, who think nuclear war will lead only to mutual suicide on the part of the superpowers.

Civil defense is the talisman of those who believe that nuclear war is survivable and, what is more, that its consequences can be dealt with strategically, morally and politically in the same manner as conventional war. Those who deny that there is a fundamental difference between conventional and nuclear war assert that one can, through some act of ingenuity, defend against its ravages.

Civil defense proponents frequently compare the casualties suffered in Hiroshima to those incurred through the non-nuclear bombardments of Dresden or parts of the Soviet Union during World War II. There is the continued insistence that nuclear weapons may be larger but they are nonetheless like other weapons.

"You know, it's an enormous, gigantic explosion," said William Chipman, chief of the civil defense division in the FEMA, describing the effect that a bomb 100 times the power of the one dropped on Hiroshima would have on the city of Washington. "But it's still an explosion, and just as if a shell went off down the road, you'd rather be lying down than sitting up, and you'd rather be in a foxhole than lying down. It's the same thing."

The opposing notion, that nuclear weapons are fundamentally different from past conventional weapons in that a nation cannot hope to win anything through their use, tends to be viewed by key members of this Administration as the product of ignorance or fear.

Richard E. Pipes, now a member of the National Security Council staff, wrote in an article before joining the government: "A large part of the U.S. scientific community had been convinced as soon as the first atomic bomb was exploded that the nuclear weapon, which that community had conceived and helped to develop, had accomplished a complete revolution in warfare."

AN ACT OF FAITH

Pipes went on to deride that notion as "an act of faith on the part of an intellectual community, which held strong pacifist convictions and felt deep guilt at having participated in the creation of a weapon of such destructive power."

The belief in the survivability of nuclear war draws heavily on what is claimed to be the Soviet view of the subject. The Administration claims that the much larger Soviet investment in civil defense of \$2 billion a year—as opposed to \$125 million by this country—has given the Russians the hope not only of surviving but, indeed, winning a nuclear war against the United States.

But a 1978 Central Intelligence Agency report on Soviet civil defense noted that 75 percent of Moscow's civil defense budget represents manpower costs. The \$2 billion is not what the Soviets actually spend, but an estimate of what it would

cost them if they paid their troops on the same wage scale used by the United States—which they don't.

President Reagan long has seen civil defense as necessary to deterring the Soviets. In a February, 1980, campaign press conference in Montgomery, Ala., Reagan said the Soviet Union's leaders were convinced that a nuclear war with the United States "is not only possible, or survivable, but winnable" because of what he characterized as a multibillion-dollar Russian civil defense and underground shelter program.

GOP PLATFORM PLEDGE

The 1980 Republican platform pledged "to create a strategic and civil defense which would protect the American people against nuclear war at least as well as the Soviet population is protected.

A healthy respect for Soviet civil defense underlies much of the Reagan Administration's analysis of the Soviet nuclear threat and of the President's plans for massive investments in the MX missile system and the B-1 bomber, weapons that are seen as essential to overcoming that threat.

In announcing the decision to go ahead with a modified MX missile and the B-1 bomber, Reagan last October included civil defense as part of the new strategic program.

The claim that U.S. land-based missiles are vulnerable to a Soviet first strike, as well as the acceptance of nuclear war-fighting as a plausible goal, are based on the assumption that casualties can be kept to an "acceptable" level in a general nuclear war. This presupposes that the Kremlin's civil defense program will be effective to the extent of providing the Soviets with acceptably low fatalities in the face of a U.S. retaliation.

That the Soviets believe this to be the case was argued by Pipes in a much publicized article, published four years before he became the National Security Council's senior Soviet expert. In that article, entitled: "Why the Soviet Union Thinks It Could Fight and Win a Nuclear War," Pipes criticized the policy of previous administrations:

"The U.S. theory of mutual deterrence postulates that no effective defense can be devised against an all-out nuclear attack. It is this postulate that makes such a war appear totally irrational. In order to make this premise valid, American civilian strategists have argued against a civil defense program, against the ABM (anti-ballistic missile) and against air defenses."

Deputy Undersecretary of Defense for Strategic and Nuclear Forces T. K. Jones was another major contributor to this view of Soviet civil defense. Before joining the Reagan Administration, Jones worked for the Boeing Co. evaluating Soviet civil defense programs. In testimony before congressional committees, he advanced the notion that the Soviets consider nuclear war winnable because of their civil defense planning—and that the United States should plan likewise.

Jones has pushed hard within the Administration for a big civil defense program. In a recent interview with *The Times*, he stated that the United States would recover fully from an all-out nuclear war with the Soviet Union in just two to four years, if it had a Soviet-style civil defense.

SHOVELS ARE NEEDED

"Everybody's going to make it," he observed during the interview, "if there are enough shovels to go around." The shovels are needed, he said, to build primitive shelters in the countryside for the evacuated urban population.

Jones's idea is, "Dig a hole, cover it with a couple of doors and then throw three feet of dirt on top. It's the dirt that does it."

Like a number of people in the Reagan Administration, Jones has been associated with previous calls for the United States to develop a civil defense program comparable to that of the Russians. Now he speaks with the confidence of someone whose time has come.

But any effort to emulate the Soviet program is bound to run into the criticism of those who have studied the intelligence data and feel that the claims made for the Soviet program by Pipes and Jones are vastly exaggerated.

Marshall D. Shulman, the top Soviet expert in the Carter Administration, said recently, "Everything I have seen in the way of studies, both of the initial blast effect and the subsequent radiation effect, indicates that nothing repre-

sending our present societies or infrastructure or manner of living would be likely to survive it. Particularly, the long-term effects of radiation would make it difficult to begin the rebuilding process for a long time to come. That is true for the Soviet society despite the rather limited civil defense program they've had."

TOTAL CATASTROPHE

Shulman, currently the director of the Russian Institute at Columbia University, added: "I see nothing in the Soviet literature that leads me to the conclusion that the Soviet leadership believes that a nuclear exchange would be anything less than total catastrophe. The civil defense program isn't that substantial. It is by no means of an order that would give the Soviet leadership confidence that they could substantially reduce their casualties, both their immediate casualties and their long-term casualties. They'd have to be out of their minds to think it would do that."

Walter B. Slocombe, who was deputy undersecretary of defense for policy planning in the Carter Administration and who recently debated T. K. Jones in four lengthy briefings for congressmen, remains skeptical of the claims made for the Soviets' civil defense program.

"I don't think the Soviet system works very well," Slocombe said recently. "He (Jones) thinks it works extremely well."

Slocombe added, "The idea that you are going to somehow fundamentally reduce Soviet vulnerability to a nuclear attack . . . directed against cities and industries by evacuating the cities, which is about what the plan is when you strip it of encumbering detail, is just fantastic."

His point is that it would take the Soviets, according to their own and Jones' estimates, a week to 10 days to evacuate their cities and that if the United States were interested in maximizing civilian casualties, it could simply re-target to hit the evacuated populations and their water, energy and food supplies.

The U.S. targeting plan, however, does not aim at increasing civilian casualties but rather at destroying industrial and military targets.

Jones concedes that the industrial targets are the vital concern as far as hoping for the recovery of society. But his studies conclude that the Soviets have an effective program for protecting key industrial personnel with shelters and for saving equipment by packing machinery in dirt.

While at Boeing, Jones attempted to follow the instructions of Soviet civil defense manuals by covering machinery with dirt and exploding TNT in the vicinity. He concluded that the Soviets' plans for evacuating their urban populations, packing dirt around factory machines and digging simple shelters covered by doors and dirt were highly effective.

As Jones put it: "The facts of the matter are that a one-megaton bomb dropped in Los Angeles is going to wipe out most of the people in a 75-square-mile area if we don't do anything to protect them. If we do, the lethal area is cut down to about two square miles."

As to the fate of a typical Angeleno outside the two-square-mile area, Jones replied, "His house is gone, he's there, wherever he dug that hole . . . You've got to be in a hole. The dirt really is the thing that protects you from the blast as well as radiation, if there's radiation. It protects you from the heat."

Slocombe responded, "I find it hard enough to believe evacuation scenarios (but) the burying in dirt and surrounding machine tools with sandbags are even more fantastic. It is one thing to say that if people thought a nuclear war was coming and could somehow be convinced it would help, they would—in both countries—stream out of the cities, whatever their governments wanted them to do."

"And believe me, Americans would stream out of the cities just as well and just as far and to a much more attractive environment than would the Russians. But the idea that people would bury their industry in some useful way before they went—and there is no preparation for this, there is a certain amount of noise but there is not even an allegation that there is any serious preparation for that effort—it's just fantastic. I don't think you could improve on the CIA's conclusions on this subject."

BUREAUCRATIC DIFFICULTIES

The study to which Slocombe referred was the 1978 report compiled by the CIA which concluded that the actual performance of the Soviet civil defense system was somewhat less perfect than a reading of their manuals might indicate.

"Bureaucratic difficulties and apathy on the part of a large segment of the population have retarded implementation in the past, though, in wartime, such

problems would probably diminish. A sustained effort has been made to provide blast shelters for the leadership and essential personnel. Programs to protect industry by geographic dispersal have not been implemented to a significant extent, however, and there is little evidence of hardening of economic installations."

As to the claim by Jones and others that the Soviets actively have been dispersing their industry throughout the country to minimize the effects of bombing, the CIA report concluded: "Soviet measures to protect the economy could not prevent massive industrial damage. The Soviet program for dispersal of industry appears to be offset by a contrary tendency for investments in new facilities to be inside or near previously existing installations."

The CIA report specifically denied that the Soviets' civil defense measures would give them the confidence to launch a first-strike attack with the hope of winning a nuclear war, as Pipes and others in the Reagan Administration have argued.

"They (the Soviets) cannot have confidence, however, in the degree of protection their civil defense would afford them, given the many uncertainties attendant to a nuclear exchange," the report said. "We do not believe that the Soviets' present civil defenses would embolden them deliberately to expose the U.S.S.R. to a higher risk of nuclear attack."

Nor did the CIA feel that this uncertainty would lessen in "the foreseeable future."

Just what would be in store for the Soviets, at a minimum, was indicated in a recent report of the International Institute for Strategic Studies in London, which discounted the possibility that nuclear war-fighting could be limited or controlled.

The report's author, Desmond Ball, an authority on targeting plans, wrote that even if the United States followed its current nuclear targeting plan, which aims at military and industrial targets and avoids civilians, an unavoidably high number of civilians would nonetheless be killed.

"Simply by virtue of associated industrial and military targets, all of the 200 largest Soviet cities and 80 percent of the 886 Soviet cities with populations above 25,000 are included in U.S. war plans," Ball wrote. "Many of these cities would receive more than 10 warheads. Approximately 60 warheads would be detonated within the Moscow city limits; peak overpressures throughout the central Moscow area would be so severe that not a building or tree would remain standing."

RAVAGES OF NUCLEAR WAR

Ball added that, in addition to upward of 100 million dead and 30 million injured, such an attack would destroy 70 percent to 90 percent of Soviet manufacturing capacity.

Such estimates of the ravages of nuclear war, Ball warned, "are almost certainly underestimates of the actual casualties" because estimates "are invariably based on those variables (such as blast and fallout) that are relatively easy to calculate and generally ignore other effects that would surely take place but whose magnitude cannot be calculated."

Among those effects are the fire produced by the blast, death due to lack of medical care, long-term cancer deaths, and death caused by the destruction of crops and livestock. Ball estimated that when these other matters are factored in, the fatality figures could be double the 100 million his own study predicted.

A CIA analyst who helped prepare the agency's study on Soviet civil defense concurs in Ball's study. The analyst, who did not want to be identified, said: "We've looked at the blast and primary radiation effects. What we've done is nothing like what would be required to determine what the total effect on the (Soviet) population would be. We have not done that study because I don't know how you would do it. We've thought long and hard about how we'd do it and we don't know. There are too many imponderables. It isn't a modelable thing."

He then paused and added, "I get kind of tired of the issue after a while" because of the dreary imponderables.

Then he blurted out: "What's going to happen? They (the burn victims and others) aren't going to be helped. There are going to be thousands of people who needed assistance immediately, and it's not going to be available. And they're either going to die or they're going to linger on for a long time. The average level of activity in the society would be lowered significantly, to mere survival, to helping your friends and associates do what is necessary to keep on living. No one is going to be out there running lathes and rebuilding society . . . They're going to be dying."

[From the Los Angeles Times, Jan. 16, 1982]

AMERICANS WOULD NOT BE HELPLESS—U.S. COULD SURVIVE WAR IN
ADMINISTRATION'S VIEW

(By Robert Scheer)

As tension increases between the superpowers, a macabre question is becoming central to a growing national debate over the implications of the nuclear arms race. Can the United States survive a nuclear war with the Soviet Union?

There seems to be an inclination, at least within the Administration, to look upon nuclear conflict as something less than a terminal holocaust (or the biblical prediction for Armageddon).

Statements about attaining a nuclear war-fighting capability, limited nuclear war, the development of tactical nuclear weapons and an increased emphasis on civil defense all assume that "nuclear war-fighting," as it has come to be known, is compatible with the continuance, after a brief and manageable interruption, of civilization more or less as we know it.

T. K. Jones, Deputy Undersecretary of Defense for strategic and nuclear forces, told *The Times* that with proper civil defense, it would take only two to four years for the United States to fully recover from an all-out nuclear war with the Soviet Union.

The Federal Emergency Management Agency (FEMA), which is in charge of the U.S. civil defense program that the Reagan Administration plans to expand, has declared that "the United States could survive nuclear attack and go on to recovery within a relatively few years."

In columns and commentaries prepared for publication in local newspapers, the agency has argued that "Americans would not be helpless. . . . They could meet and overcome all the challenges of the post-attack environment" by taking such protective measures as evacuation of urban populations, survival training and the construction of simple fallout shelters.

William Chipman, chief of FEMA's civil defense division, likens what his agency calls "post-attack recovery" to the problems encountered in other major but survivable historical disasters.

He conceded that "there would be a succession of problems, a succession of hurdles to be surmounted." But then he pointed to a fatalities chart showing that most people would pull through. "When they figure fatalities, they figure it on the basis of your Crimean War medical care, which is to say, almost none," he observed on the chart's methodology.

"And yet, if I remember rightly, of the people who reached the so-called hospitals of the Crimea—they were more or less like sheds—I think 85 percent . . . eventually survived, essentially unaided, essentially prearrival of *Ms. Nightingale*."

His comments were directed at the increasing number of doctors who have organized in groups, such as Physicians for Social Responsibility, to call attention to the implications of nuclear war. Chipman took particular umbrage over testimony by Dr. Howard Hiatt, dean of the Harvard School of Public Health.

Hiatt told a Senate committee last year: "Recent talk by public figures about winning or even surviving a nuclear war must reflect a widespread failure to appreciate a medical reality: Any nuclear war would inevitably cause death, disease and suffering of epidemic proportions, and effective medical intervention on any realistic scale would be impossible."

Hiatt, who met recently with President Reagan as one of a group of emissaries from Pope John Paul II concerned about the possibility of nuclear warfare, noted in his Senate testimony that, after the Aug. 6, 1945, bombing of Hiroshima, most of the doctors in the city were killed or seriously wounded. Only six doctors were available to treat the 10,000 wounded who made their way to Hiroshima's 600-bed Red Cross hospital, Hiatt said.

There was eventually outside help for Hiroshima's wounded, which Hiatt argued would not be forthcoming in an all-out nuclear attack on the United States. Furthermore, he said, the size of the bombs dropped would be several hundred times larger.

Hiatt cited an Arms Control and Disarmament Agency study that postulated a one-megaton attack on the city of Washington. The result would be that of the area's 2.5 million inhabitants, more than 600,000 would be killed and 800,000 injured. Hiatt said he doubted there would be the one-week notice to evacuate

the population on which Chipman and other civil defense officials base their projections. And because medical facilities and supplies are concentrated in the urban area, the surviving population would not be treated.

As Hiatt put it, somewhat rhetorically: "Can the seriously injured be treated at George Washington University Hospital? It no longer exists. Georgetown University Hospital? It, too, has been destroyed. In ruins, as well, are Howard University Hospital, D.C. General, Capital Hospital and several others."

The emergency management agency has conceded in one pamphlet that "a large-scale nuclear attack on the United States would cause great numbers of casualties, and there would be fewer doctors, nurses and hospitals available to care for them. Even in areas where no nuclear weapons exploded, radioactive fallout could prevent doctors and nurses from reaching injured or sick persons for a considerable period of time."

But the answer, the agency said, is that "people would have to help each other during the emergency" by depending upon their own knowledge of first aid.

The agency has also urged both adults and teen-agers to acquire these valuable skills by taking free courses that are offered in many communities, such as Red Cross first aid courses.

Further detail has been provided in another agency publication, which offers a seven-point plan for dealing with burn victims. It suggesting giving the patient water and covering the burned area with dry gauze.

Because burn victims will be numerous, Hiatt does not find the agency manual's suggested care adequate.

"Let me cite one reason for my pessimism by describing the case of a 20-year-old man who was hospitalized last week in the burn unit of Boston's Massachusetts General Hospital," he said. In the first eight days of hospitalization, this patient needed 102 units of fresh frozen plasma, 42 units of fresh-frozen red blood cells and 12 units of platelets to compensate for losses from the burned areas. He had two four-hour operations, each requiring four surgeons, two anesthetists and several nurses. He was on a respirator constantly and required highly specialized nursing care around the clock. Many professionals and technicians in other hospital departments were constantly called upon."

Hiatt quoted the head of the burn unit as saying that "just to keep one such patient alive taxes us." Hiatt added, "No amount of preparation could provide the human and physical resources required for the care of even a few such patients hospitalized simultaneously in any city of the nation. Yet one must assume that at least tens of thousands of such casualties would result in every metropolitan center hit by a nuclear weapon."

Mass deaths also would present hazards to the survivors. Physicians argue that pestilence, for example, would be a problem even if tens of millions should manage to survive the effects of the initial blast, fire and radiation.

Dr. Herbert L. Abrams of the Harvard Medical School suggested in a report last month to the American Association for the Advance of Science that "insects, many of which have an unexplained immunity to radiation, would thrive on the unburied corpses, infest surviving animals and, eventually man."

He predicted the resurgence of diseases such as the plague, cholera, smallpox and typhoid, not to mention a huge increase in influenza, pneumonia, meningitis and hepatitis.

The position of the emergency management agency is quite the opposite. A pamphlet supplied by Chipman assures readers that "the specter of pestilence and disease stalking the land in the aftermath of nuclear war is probably just that—a specter, not a realistic probability. It need not, and probably would not, occur."

The agency's position is that the major scourge diseases have been eradicated and cannot return. Because knowledge of sanitation and vaccines is widespread, the agency assumes that the survivors would be able to employ this to good advantage.

"Even under the worst circumstance imaginable," said a pamphlet called "Recovery from Nuclear Attack," there would be "no danger of a repetition of the bubonic plague that devastated Europe in the mid-14th Century."

The bubonic plague is a source of considerable optimism to Chipman, who observed, "It was horrifying at the time, and yet six or eight years later, not only had English society rebounded but, by God, those people went out on an expeditionary force to France."

Chipman's optimism is typical of the literature that FEMA has produced over the years.

"Would Survivors of Nuclear Attack Envy the Dead? . . . Experts Say 'No.'" That question and its answer headline one of 15 "camera-ready newspaper columns" the agency currently distributes for placement in local papers.

Most of the columns deal with the details of surviving the holocaust, such as the construction of a "preplanned snack bar shelter (Plan D)" in one's basement which can double as an entertainment center before the attack and, it is hoped, after.

Some of the columns would be useful in everyday emergencies, such as the "special advice on tourniquets" that cautions that, "If the situation forces use of a tourniquet to keep the patient from bleeding to death (for example, when a hand or foot has been cut off), place the tourniquet as close to the wound as possible, between the wound and the patient's heart."

But clearly one is not going to get too involved with the techniques of surviving a multi-megatonnage attack unless there is a positive answer to the original question of whether the survivors would envy the dead.

Chipman noted darkly that it was none other than the late Soviet Premier Nikita S. Khrushchev who first articulated that view of nuclear survivors. The agency takes issue with the pessimists.

As one agency publication says: "In the face of the awesome power of nuclear weapons, the emotional response to the question of whether the living would envy the dead often is, 'Yes.' But data and conclusions drawn from complex and sophisticated studies do not support that view."

"A close look at the facts shows with fair certainty that with reasonably protective measures, the United States could survive nuclear attack and go on to recover within a relatively few years."

To which civil defense director Chipman added a personal prediction: "It's very depressing and horrible on the one hand, but if worse ever came to worse, I think people would be miserable, but they would in all probability rise to the occasion and restore some kind of a country that would fairly be called the post-attack United States. No one would ever forget what had happened, and I hope to God if it ever happened once, it would never happen again."

Asked if he thought that democracy and other American institutions would survive, Chipman replied: "I think they would eventually, yeah. As I say, ants will eventually build another anthill."

[From the Los Angeles Times, Jan. 21, 1982]

CIVIL DEFENSE: WHO NEEDS IT?

This country has had a civil-defense program of sorts for 30 years. Except for a brief spurt of interest by President Kennedy in shelter-building, however, proposals for an ambitious nuclear-survival program have never been taken seriously by the government or by the American people.

As Times staff writer Robert Scheer reported last Friday, however, some officials in President Reagan's Pentagon are determined to change all that.

The Administration has in fact made a tentative decision to ask Congress for a near-doubling of the civil-defense budget to \$237 million in the next fiscal year. If the zealots in the Pentagon and the federal Emergency Management Agency have their way, this would be only the first installment in a multibillion-dollar program aimed at ensuring the survival of 80 percent of the American people from a large-scale nuclear war.

We urge the President to take a closer, more skeptical look before he goes too far down that road.

Several countries—including Switzerland, Sweden and China—have civil-defense programs far more extensive than the United States'. The renewed interest in this country is largely a reaction, however, to the massive population-protection program in the Soviet Union.

The Soviet program includes shelters, "hardening" of manufacturing plants to reduce damage from blast and radioactivity, and plans for the evacuation of cities. Instruction in civil-defense procedures are given in factories and schools.

Some military strategists draw the conclusion that the Soviet Union is reaching for the ability to initiate, win and survive a nuclear war. What seems more likely is that the Kremlin is as frightened of nuclear war as the rest of us are—

but is determined that, if such a war should come, the Soviet system and the greatest possible number of Soviet citizens should survive.

In either case, the champions of a strong civil-defense argue, the United States would leave itself exposed to nuclear blackmail if it allowed a situation to develop in which this country stood to lose half its population in a nuclear conflict while the Russians would lose only 5 percent or 10 percent.

Thus the Emergency Management Agency, with the backing of civilian officials in the Pentagon, is pushing for a program featuring construction of urban blast shelter, hardening of industrial sites and plans for the evacuation of cities if a nuclear conflict seemed imminent.

A case can be made for beefing up the civil-defense program to the extent of surveying and marking basements and other facilities that could be of practical use as shelters; building up emergency stores of food, water and medical supplies, and conducting a public-information program to familiarize people with the things they could do to help their chances of nuclear survival.

We remain unpersuaded, however, that the plans for an ambitious evacuation and shelter-construction program are practical.

Expert opinion is divided on whether the big Soviet civil-defense program would actually be effective in an hour of need. The fact that billions of rubles are being spent doesn't necessarily mean that the Russians are getting their money's worth.

Pressures are growing in this country for a reduction in planned military spending. Every extra dollar that goes for civil defense is a dollar less that can be spent on other military needs. This is why Gen. David C. Jones, chairman of the Joint Chiefs of Staff, opposes a costly civil-defense effort.

Beyond that, building enough shelters to protect urban dwellers who were not incinerated in the initial blast would be prohibitively expensive, while large-scale evacuation plans simply make no sense.

Evacuating large cities would take several days. In the tense, confrontational atmosphere that presumably would prevail, the Soviet Union might well assume that the evacuation was a prelude to a U.S. nuclear attack. It might feel impelled, in that event, to get in the first blow.

If the day ever comes when an effective anti-ballistic missile defense system can be deployed within the framework of arms-control agreements with the Soviet Union, the case for an ambitious nuclear-shelter program will be stronger. The ABMs would thin out the attacking missiles and make the civil-defense job manageable.

Until then, the money can be better spent on arms that will keep the Russians persuaded that they would suffer intolerable losses in a nuclear conflict, notwithstanding their big shelter and evacuation programs.

[From the New York Times, Feb. 8, 1982]

CIVIL DEFENSE: A MYTH

(By Andrew Tolan)

United States civil defense officials, inspired by a reaffirmed Presidential directive that authorizes a new and expanded civil defense policy, are reviving dangerous and illusory assumptions about life after nuclear war.

Officials at the Federal Emergency Management Agency, which is responsible for civil defense, argue that American society would survive a nuclear war in which tens of millions of Americans died. Yet the agency's own plans clearly demonstrate the delusion in its hopes of survival.

"Crisis relocation planning" is the current watchword of civil defense planners. Federal Emergency Management Agency officials are using their \$128.8 million budget—an \$11.2 million increase over the fiscal 1981 budget—to devise "custom-made plans" for evacuation of the 380 "high-risk areas" in the United States. These evacuations would be carried out in response to similar Soviet evacuations, to avoid, as a spokesman put it, "a disparity of vulnerability."

The plans call for the "survivability" of 80 percent of our population. Thus, the agency's 204 nuclear civil protection planners will be "successful" if only 44 million Americans die in a nuclear war.

Crisis relocation presupposes a predictable buildup of international tensions, followed by swift, orderly evacuations of "risk areas." But crisis relocation would merely create new locations for the crisis.

In a list of "Ten Illusions of Civil Defense," two physicians, H. Jack Geiger and Eric Chivian, note that even if major evacuations of the 380 risk areas were successful—an unlikely prospect, given the usual choking of roads and highways during daily rush-hour traffic—the Soviet Union could simply retarget its missiles. Mass evacuations would take at least three days. The Russians can retarget missiles in a fraction of that time.

Many of the 380 "custom-made plans" are completed. In Plattsburgh, N.Y., for example, residents are instructed to "prepare now. . . . Check to see if you live in the Risk Area. . . . Check your route assignment and route map. . . . Check your home for security. See that all locks are secure. Close all window shades, blinds and drapes." These instructions are for people physically able to evacuate.

What about those unable to move themselves, like people in hospitals? The Plattsburgh instructions address this problem: "If you are in a hospital (or any institution) you will be evacuated. Patients who cannot be removed because of special requirements will be sheltered and cared for in case of imminent attack." How?

The agency's secondary plan—placing us in fallout shelters—is what officials there call the "in-place option for saving lives." But fallout shelters are not blast shelters. Within five miles of a nuclear strike, as Dr. Geiger points out, fallout shelters heat to 800 degrees Centigrade (1472 degrees Fahrenheit) and "become crematoria, in which people are simultaneously dry-roasted and asphyxiated."

Suppose millions of urban residents were successfully relocated. And suppose most of them found their way to sufficient fallout shelters—stocked with ample supplies of food, water, and uncontaminated air—miles from the nearest nuclear strike. After two weeks, when radiation levels went down, these refugees would emerge and return—to what?

Inevitably, many "relocatees" would not find shelters. Where would they hide? The agency's fallout map of the United States looks like a satellite weather photo on a bad day.

Do the agency's officials and outside "survivalists" really think there will be a society left to rebuild?

With millions dead and dying; with irradiated crops, water supplies, and wildlife; with no news media, telephone lines, sewer systems, schools, hospitals, and banks—do these people really believe survival is possible?

Agency officials acknowledge that millions of people suffering from radiation sickness would be untreatable. In the spring 1981 issue of the agency publication "Emergency Management," the nation's civil defense director, William K. Chipman, wrote: "Definitive treatment cannot be provided for survivors suffering radiation sickness. Care for radiation casualties include bedrest, nursing, and other supportive care."

The Government's opium stockpiles form the basis for this "other supportive care." The Government has recognized the hopelessness of nuclear war and is stockpiling 71,303 pounds of opium to meet "essential civilian needs" during a national emergency. This futility is further acknowledged by the agency's "re-analysis of nuclear requirements," which calls for an additional 58,697 pounds.

The Government should stop funding programs based on cruel, false hopes of survival. It is time to spend money on the prevention of nuclear war, not on ludicrous mopping-up plans for the post-attack era.

[From the Sunday Mercury News, Jan. 17, 1982]

CIVIL DEFENSE?

Along with Hula Hoops, Davy Crockett caps and Levittown, the backyard fallout shelter was one of the prime targets of social satirists during the late 1950s and early '60s. A bit more macabre than the other fads of the era, perhaps, but on the whole harmless, and good for a few laughs.

Friday morning's story by Robert Scheer of the Los Angeles Times evoked memories of the fallout shelter mania and the mentality that created it. This time, though, we don't hear anybody laughing.

According to Scheer's account, the Reagan administration has decided to revive the nation's program of civil defense against nuclear war, dormant for two decades. The Federal Emergency Management Agency has developed, and the White House reportedly has approved, a complicated and costly scheme calling for mass evacuation of urban populations to radiation shelters in the countryside.

The FEMA plan reportedly met strong opposition from the Office of Management and Budget because of its cost—the ultimate price tag has been put as high as \$10 billion—and from Air Force Gen. David C. Jones, chairman of the Joint Chiefs of Staff, who felt the money could be better spent elsewhere. But, according to Scheer, President Reagan personally overrode those objections.

A FEMA spokesman would neither confirm nor deny that the White House has endorsed the plan, but he acknowledged that his agency has been pushing the mass-evacuation idea since the 1960s. The plan is built, he said, on "the premise that there would be no Pearl Harbor-type nuclear attack" and people would have several days to move out of urban areas.

"Performance in a large-scale, mid-1980s attack would be on the order of 80 percent survival of the U.S. population," the proposal says, "if the bulk of the risk-area population had been evacuated to host areas prior to attack, and if fallout protection had been developed and other crisis action taken."

Those are some pretty hefty "ifs."

Assuming that the Soviets would be polite enough to give us several days, or even several hours, notice of their attack seems to push credulity to new frontiers. And anybody who has crept from San Jose to Palo Alto during the morning rush hour can form some notion of what it would be like to try to move the whole population of the Bay Area to, say, Mendocino County amid the terror that a nuclear attack warning would create.

There are a few other sizable ifs that the proposal doesn't even seem to consider.

For instance, even if a mere 20 percent of the population was killed outright in a nuclear exchange—about 40 million dead, let's say—what would happen to the survivors? What would they eat, what would they drink, what would they do for medical care, how would they dispose of 40 million corpses?

As we've all seen in recent weeks, just a few inches of rain can totally disrupt a metropolitan area's transportation and communications systems. What kind of shape can we expect those and other components of the social network to be in after the H-bomb's hit?

One more thing to think about: Many scientists believe that any major nuclear exchange would destroy the earth's ozone layer, letting in ultraviolet radiation that would blind all land-dwelling creatures and thus, in a matter of weeks or months, bring an end to life on earth as we know it. The survivors of nuclear war might emerge from their radiation shelters to find a dead or dying planet.

A massive civil defense program against nuclear attack is an idea that every president from Eisenhower on down has considered—and rejected as lunacy. Maybe FEMA has just dusted off its shopworn idea and peddled it to a hawkish and slightly gullible administration. The whole affair might be nothing more than bureaucratic empire-building—expensive, but essentially harmless.

But a far more frightening interpretation is possible. Many of the pronouncements and many of the strategic weapons decisions of the Reagan administration seem to indicate that it thinks the United States could fight, survive and win a nuclear war. The new emphasis on civil defense can be read as another—and an exceedingly ominous—signal of the same thing.

We aren't sure—nobody is sure—exactly what the civil defense proposal means; we plan to explore that question with people who know more than we do, and we'll share with you what we learn. We are sure of this much: There's nothing in Scheer's story to make us, or any American, feel more secure.

Senator PRESSLER. This concludes our hearing. I shall now conclude this panel of witnesses, and I now call the ACDA nominees to the front.

[Whereupon, at 11:45 a.m., the subcommittee adjourned, subject to call of the Chair.]

UNITED STATES AND SOVIET CIVIL DEFENSE PROGRAMS

WEDNESDAY, MARCH 31, 1982

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL, OCEANS,
INTERNATIONAL OPERATIONS, AND ENVIRONMENT OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 2:20 p.m., in room 4221, Dirksen Senate Office Building, Hon. Larry Pressler (chairman of the subcommittee) presiding.

Present: Senators Pressler, Percy, Cranston, and Tsongas.

Senator PRESSLER. I shall call this meeting of the Subcommittee on Arms Control, Oceans, International Operations, and Environment to order.

I wish to announce that I have sent a letter to Senator Percy asking that major full committee hearings on arms control be held, or that joint hearings with the House Foreign Affairs Committee be held.

This subcommittee held hearings across the United States last year and early this year. It was the first time that had been done in 26 years. The decision to hold those field hearings was made before the press recognized the widespread popular interest in arms control and the nuclear freeze resolution. We held a number of hearings throughout last year and this year to highlight arms control issues.

Let me say that there is a wide range of opinions on the subcommittee and the committee, and our efforts have been to look into not only the arms control issues but also the civil defense issues. Civil defense programs are the subject of the hearing today. We are here to hear from a Department of Defense witness, Mr. T. K. Jones, and after opening statements are heard I will call for his statement, and we shall direct questions to him.

I know there has been some controversy surrounding this. We have acted very carefully, and in a very cooperative fashion with the Defense Department, but it has been my strong feeling that we should not have been put off two or three times in our efforts to question Mr. Jones. He is here today, and I appreciate that very much.

I do not want to belabor this issue, but I do feel that the Department of Defense made a serious error in initially refusing to allow him to testify. As you know, the subcommittee is perfectly willing to hear from whatever spokesman the Department of Defense wishes to provide to express the position of the Reagan administration on issues. However, I should point out that Mr. Jones has made many public

statements and many public appearances on civil defense, and if it is appropriate for him to speak in all of those forums, certainly the Congress of the United States should be able to hear from him. Therefore, we have insisted upon the right to question Mr. Jones.

I will not go through all of the hearings that have been scheduled. We have been told that he had a scheduling problem. Then, later, we were told that he was not the proper spokesman, and later we were told other things. Let me say just a few words as to why the substance of Mr. T. K. Jones' remarks has been so alarming.

Let me quote from the "NBC Nightly News" TV interview on March 4, when Mr. Jones said:

If the Russian people can survive, then I see no reason why we can't do it as well as they can. If they choose to do the things that they have talked about to protect their industry, on the order of two-thirds of that would survive to the point where production levels after a period of 2 to 4 years can go back to where they were before the war.

The subcommittee has taken special care to be certain that Mr. Jones was not quoted out of context on this occasion or on other occasions when he spoke on civil defense. It appears that he has been quoted accurately, and that his views have been consistent.

At best, the views that Mr. Jones has been expressing regarding the relative ease with which the United States could recover from a major nuclear war if it had a Soviet-style civil defense system may seem half-baked and not well thought out, or, to put the matter a little more diplomatically, his concept of survival from nuclear attack is one dimensional. Even, and I stress even, if the basic industrial capacity of the United States were to survive a full-scale nuclear attack, Mr. Jones does not take into proper account the immense damage done to the population, the communications network, the croplands, the livestock, the entire social and psychological spectrum, and the staggering medical consequences of such a war.

I have several questions for Mr. Jones, but first I shall yield to my colleagues and others who are coming—we have several votes underway—but let me again say that I think this subject is very timely, and not only civil defense but the issue of arms control. I have written to our chairman urging that joint hearings be held with the House on this issue which now has become so prominent in our Nation's thinking—the first such joint hearing since 1952.

The subject we are looking at today is narrower, in a sense, civil defense, but it still is a very relevant aspect of arms control.

I shall now call on any other Senators with opening statements before we start the questions.

Senator Cranston.

Senator CRANSTON. Thank you very much, Larry. I first want to thank my colleagues for their consistent support of my personal effort—begun last January—to bring Mr. T. K. Jones before this committee.

I believe this series of hearings on the Reagan administration's faulty and perilous civil defense plan is the most important this committee has held so far this session.

The administration wants to spend more than \$4.2 billion over the next 7 years on shovels, concrete, and civil defense relocation plans.

That would be a total waste of money and an economic tragedy in this time of high deficits and unbalanced budgets.

Even worse, the Reagan administration's plans are a cruel and dangerous hoax on the American people. They mislead people into a false sense of security, the illusion that they and the fabric of our society can survive an all-out nuclear war. Unjustified emphasis on civil defense encourages the false notion that nuclear war is survivable, tolerable and perhaps even winnable.

Every President since Dwight Eisenhower has reviewed—and spurned—various civil defense proposals. Except for a brief flurry of activity during the time of the Cuban missile crisis every President since Eisenhower has rejected, as impractical and unworkable, grandiose civil defense schemes. No civil defense scheme can protect the core of our society and our natural environment against annihilation and incineration in an all-out nuclear exchange.

Just 2 weeks ago Spurgeon Keeny, former Deputy Director of the Arms Control and Disarmament Agency, told this committee that the administration's notion that the Nation could somehow quickly recover from an all-out nuclear war "could encourage policies and actions which could, in fact, result in the complete destruction of our society, if not civilization."

Adm. Noel Gayler, the former Deputy Director of the Joint Strategic Targeting Planning Staff, told this committee that civil defense won't work . . . is bad policy . . . is wasteful . . . has no military utility . . . makes no economic sense (and) is (a) dangerous illusion."

Top CIA officials have briefed committee members in closed session on the Soviet civil defense program. I believe we all came away convinced that the Soviet civil defense effort would be of little consequence in the event of a major U.S. attack. The Soviet civil defense program, in the words of Admiral Gayler, "is a turkey, as they are beginning to realize."

The Soviets may be beginning to realize that civil defense is unworkable in a nuclear war, but the Reagan administration is still laboring under the illusion that it can work and it is trying to sell this dangerous illusion to the American people.

Mr. T. K. Jones, the Deputy Under Secretary of Defense, travels about the country declaring that in the event of an all-out nuclear war "everybody's going to make it if there are enough shovels to go around."

This is no new aberration for Mr. Jones. His views on this subject are well known, and well documented.

In 1976, Mr. Jones told the Joint Committee on Defense Production that "98 percent of (the Soviet) people" would survive an attack "in which the United States would throw "everything we had at the Soviet Union."

Mr. Jones told a House Armed Services Panel that same year that "we would tend to lose slightly more than they because we have only about one-third of the land area * * * however, the loss numbers would not be all that much different."

In 1978, Mr. Jones told the NOVA program that "by protecting our machinery we can get our recovery time down to where we can restart

production in something like 4 to 12 weeks and can be back at present levels of production in about 1 year."

In more recent weeks, Mr. Jones has been talking about "assured survival" from nuclear attack.

And then there is the remarkable January interview with Robert Scheer of the Los Angeles Times, wherein Mr. Jones advised Americans that they could survive nuclear war if they would just "dig a hole, cover it with a couple of doors and then throw three feet of dirt on top. It's the dirt that does it."

Mr. Chairman, these statements are so far beyond the bounds of reasonable, rational, responsible thinking that they raise questions not only about the fundamental judgment of Mr. Jones but of the administration that grants him free reign and authority, and which harkens to his siren song of civil defense.

The myth of effective civil defense is further exacerbated by the bellicose rhetoric of certain administration officials about limited nuclear war and nuclear war fighting.

These provocative statements could lead to Soviet miscalculation about American intentions—a perilous possibility.

On the other hand they have, to a large extent, helped create a whole new national constituency which supports—indeed demands—an immediate, determined effort to make swift progress on meaningful arms reductions. And for that I suppose we should be grateful.

Congress at long last is responding to the American people who are fed up—and angry—with the ever-increasing, ever costlier, ever more dangerous arms race.

The revival of civil defense schemes is as much a part of an accelerated arms race as any new weapons system.

I await with keen interest to hear the scientific basis for Mr. Jones' self-confident claims that civil defense will save us all.

Senator PRESSLER. Thank you.

Senator TSONGAS.

Senator TSONGAS. Mr. Chairman, there are two issues here. One is the issue that Senator Cranston raised. These statements and others that have been made are so far beyond the pale of reason that I think it would probably be incumbent, assuming there is a history that survives war, that we put all of these hearings into a time capsule and bury them in some remote area with an appropriate sign. So that if people are ever asked the question, how did it happen, it will give them a clue that there are people who really thought you could do this and survive.

The second issue is the question of whether there is such a thing as a Congress with oversight responsibility. Now, we have been here a number of days trying to get Mr. Jones before us. Mr. Jones has traveled around the country. He was in Senator Percy's State the other day. We have been put off and put off. Now we finally have a hearing, and we have before us a phalanx, indicating that there is, I guess, a real commitment to civil defense, if you look at the table and those who are there to support Mr. Jones.

It seems to me that if someone is free to wander the country and make the kinds of statements that give the impression that nuclear war is survivable, then does it not make sense that we would have the same privilege? I do not recall that Mr. Perle went with Mr. Jones

around the country. I do not recall that General Doyle went with Mr. Jones around the country, or that Mr. Chipman went with Mr. Jones around the country.

All that we are asking is the same access to information that our countrymen have received. I think we deserve no less.

Mr. Chairman, it would be very easy for you to simply let this issue go away. I know you are under a lot of pressure not to hold these hearings, and so forth, but there is no other issue. If we are wrong on this one, nothing else matters.

The difference between the Congress and the country is that the Congress is going one way and the country is going another. In the ultimate sense, there is going to be a dissolution of consensus. The American people have looked over the abyss, Mr. Chairman, and are seeing not fringe people but Government officials passing out shovels, saying, we are going to make it. Why do you think there is a nuclear freeze constituency? Because finally there has been in this country a recognition that there are some people on both sides who really do contemplate nuclear war as an option. There are those who think we can survive, and who make these kinds of statements.

This human species will survive only if there is a return to reason. I want these kinds of statements to be known far and wide, and hopefully to return to center, because it doesn't make any difference whether you are a conservative or a liberal, a Republican or a Democrat, a civilian or a military person, if we all go.

That distinction is also lost on our children. I would hope that we would keep that in mind.

Mr. Chairman, I am prepared for a very long afternoon, and I would hope that the witnesses are as well.

Senator PRESSLER. We have a vote on. What would you say is the best way to proceed?

[Pause.]

Senator PRESSLER. Since Mr. Jones is our witness, and he is here, I would give him an opportunity to make an opening statement.

Mr. PERLE. Mr. Chairman, I wonder if I might, although you have called on my colleague, remind you that in the discussions that led to the agreement that Mr. T. K. Jones would appear here today, it is made very plain that while we were pleased to accommodate the subcommittee in the spirit of comity between the branches—

Senator PRESSLER. I did not reach any such agreement, I reached an agreement to hear from Mr. T. K. Jones.

Mr. PERLE. Then I must put to you again the question I put to you on the last occasion we met. Are you then not interested in knowing the position of the Department of Defense with respect to the administration—

Senator PRESSLER. We are very, very interested in that, but this hearing today is to hear from Mr. T. K. Jones, and I now call upon him to make his opening statement, if he has one.

Mr. PERLE. I must protest for the record, Senator. You were explicitly informed by the Acting Secretary of Defense in responding to you on the occasion of this hearing, that I have the task of serving as the principal spokesman on civil defense and Mr. Jones is prepared to make a statement and to answer questions. But the policy questions

are to be directed at me. Mr. Jones should refrain from answering policy questions. I would hope that the subcommittee would desire to get on the record, in view of the confusion that has been created about the administration's policy, my opening statement with respect to what the administration's policy is on civil defense.

Senator PRESSLER. The chairman of the Foreign Relations Committee said yesterday that his understanding was, we would have Mr. T. K. Jones as a witness.

Mr. PERLE. And he is here.

Senator PRESSLER. Well, then, if he is here, can we hear from him? May we have his opening statement? We have a vote on, and we will have to interrupt this, but we would like him to begin, if he has an opening statement.

Mr. PERLE. If you insist on denying us the opportunity to lay before you the Defense Department's policy with respect to civil defense, I have no alternative but to yield to the chairman.

Senator PRESSLER. Please do that.

Mr. PERLE. But I want the record to show that this is in fact what you have done.

Senator PRESSLER. We wish to hear from T. K. Jones.

STATEMENT OF T. K. JONES, DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, STRATEGIC AND THEATER NUCLEAR FORCES

Mr. JONES. Mr. Chairman, I share my colleague's concern that the committee has not chosen to hear the Defense Department's policy on civil defense.

Senator PRESSLER. Would you please pull the microphone up a little closer, so that we can hear you?

Mr. JONES. I do want to reiterate that it is Mr. Perle who is responsible for civil defense policy. I am not. I am in the research and engineering side of the Pentagon. To the extent the policy organization requires technical input, I am required to supply it.

Senator PRESSLER. I do not know if the audience can hear you, but would you please bring the microphone up a little closer?

Senator TSONGAS. Mr. Jones, just pretend that we are the Los Angeles Times. Then you should feel comfortable. [General laughter.]

Mr. JONES. Mr. Chairman, in response to your request, I am here to comment on certain statements attributed to me in a Los Angeles Times article. I must say that never before in my career have I found my views in such urgent demand. Let me begin by saying that my actual views on civil defense are as published in a subsequent issue of the Los Angeles Times on March 15, 1982. I respectfully request that the committee place that article in the record.¹

To insure that other matters of record are set straight, I have not estimated the war recovery potential of the United States given a Soviet-type protection program. What I have done is to estimate the war recovery potential of the Soviet Union given Soviet plans and Soviet programs.

¹ See p. 56.

Some years ago, I directed a major research program to assess the effectiveness of Soviet civil defenses. This work included that of a great number of people with different skills, because, in my judgment, no one person and no one organization has sufficient knowledge or sufficient expertise to make a competent assessment of a program of the diversity and magnitude of Soviet civil defense.

One finding of that research effort was that if the Soviets carried out all of the provisions of their civil defense plans, they, the Soviets, could recover to a level of productive capability equal to their prewar gross national product, and they could do that within 2 to 4 years after a nuclear war with the United States.

An important facet of this finding is that it reflected only a level of restored productive capacity. It did not in any way imply that all damage to Soviet society had been repaired, and certainly did not infer that a nuclear war would be anything less than a horrible catastrophe. Nor did it imply in the context of American value judgments that we would ever consider it to be winnable.

As you, in your own statement, have noted, this is by no means new information. The results of this work were presented before at least two different committees of Congress in years past.

Themes are common in Soviet writings, particularly in their military manuals, to the effect that they believe a nuclear war could be fought and won. What is disturbing is that the Soviet statements about nuclear warfighting are being matched in their military preparations.

Senator PRESSLER. I am sorry, Mr. Jones. I hate to interrupt you. We must go to vote as quickly as we can. Please excuse us. We will return. I am very sorry about this. Would you please hold off for a few minutes?

[Whereupon, a brief recess was taken.]

Senator PRESSLER. We shall proceed to hear the remainder of Mr. Jones' statement. Then we shall have a round of questioning. Then we will hear from whoever else wishes to speak as planned. I see that another vote is coming on. Mr. Jones, please proceed.

Mr. JONES. Thank you, Mr. Chairman. Themes are very common in Soviet writings, particularly in their military manuals, to the effect that a nuclear war could be fought and won. What is disturbing is that the Soviet statements about nuclear warfighting are being matched in their military preparations. Perhaps most indicative of this Soviet belief is evidence indicating that they may have plans to reload and refire their intercontinental ballistic missile launchers after these launchers have been used to mount an initial attack.

Civil defenses are not in and of themselves a threatening preparation. The explicit warfighting capability being built into the Soviet arsenal, however, when backed by such extensive civil defenses, is a matter of concern.

Soviet civil defenses are but one element of a synergistic, multi-layered protective posture. As they have been developed in the Soviet Union, these extensive protective measures bear scant resemblance to what is understood in the United States as "civil defense." The Soviet strategic defenses appear to have focused in priority order on protecting that which is of greatest value to them.

The most extensive and the best quality protection is that provided for the Soviet leadership. It appears to us that the Soviet leaders have prepared to survive and to continue operating the country during the course of a nuclear war. To this end, they have built enough bunkers and supporting communications to outnumber the surviving accurate U.S. weapons, and the bunkers are hard enough to have good odds of surviving if targeted by our most numerous and most survivable but less accurate warheads.

Our ability to retaliate effectively against Soviet military assets is also no longer as clear as it once was. Their conventional military forces and nuclear reserves are protected by mobility. Although we could retaliate against the peacetime locations of such military units, there is doubt that such action would eliminate the fighting capability of the Soviet forces.

Several years of U.S. research and testing in and out of the Government have shown that the Soviets' population and industrial defenses protect them far better than we had previously thought possible. Even allowing for substantial degradation in a wartime environment, these passive defenses protect their people twice as well as any ABM system they could have built. An estimate made by the research program mentioned earlier is that they could limit their population losses to about half of what they lost in World War II.

Their industrial protective methods have also been studied and tested in the United States, and have been found to reduce the lethal area of destruction for large weapons by as much as 99 percent. In one test, two complete factory buildings were set up, one unprotected and the other protected using Soviet methods. The buildings were then subjected to blast pressures equivalent to those present within half a mile of detonation of a 1-megaton weapon. The unprotected factory was destroyed beyond salvage. In just 3 days, the protected factory was cleaned up and its machinery was realigned, recalibrated, and ready to run. The protected factory lost one machine.

By contrast, the American people, Congress, and this administration could never accept the mirror image of a Soviet belief that a nuclear war could be won in any meaningful sense of that word. What this disparity between American and Soviet beliefs means is that we now face the troublesome problem of deterring an adversary who does not share our beliefs.

I hope that these observations have served to clarify my views on civil defense. I particularly wish to note that I share this committee's concern that we must strengthen our ability to deter nuclear war.

[Mr. Jones' prepared statement follows.]

PREPARED STATEMENT OF T. K. JONES

Mr. Chairman, members of the Committee. I am here today at your request to comment on certain statements attributed to me in a Los Angeles Times article. I must say that never before in my career have I found my views in such urgent demand. Let me begin by saying that my actual views on civil defense are as published in a subsequent issue of the Los Angeles Times, March 15, 1982. I request the Committee place that article in the record.

To insure that other matters of record are set straight, I have not estimated the war-recovery potential of the United States given a Soviet-type protection program. What I have done is to estimate the war recovery potential of the Soviet Union, given Soviet plans and Soviet programs.

Some years ago, I directed a major research program to assess the effectiveness of Soviet civil defenses. This work included research, analysis, and actual testing and drew upon the expertise of many individuals and organizations in this country. One finding of that research was that, if the Soviets carried out all of the provisions of their civil defense plans, they—the Soviets—could recover to a level of productive capacity equal to their pre-war gross national product, and do so within two to four years after a nuclear war with the United States. To repeat, this finding reflected only a level of restored productive capacity. It did not imply that all damage to the Soviet society had been repaired, and certainly did not infer that a nuclear war would be less than a horrible catastrophe.

This is by no means new information. The results of this work were presented in extensive detail to the Joint Committee on Defense Production in 1976 and to the House Committee on Armed Services in 1976 and 1977. That said, let me address the more fundamental matter—why a strategic modernization effort that includes improved civil defense is necessary.

The Soviet government must be aware of the horrors of atomic war. Yet themes are common in Soviet writings, particularly in their military manuals, to the effect that a nuclear war could be fought and won. What is more disturbing is that the strategies expounded in these writings are being translated into operational capabilities. What the Soviets say about nuclear warfighting is being matched in their military preparations. Perhaps most indicative of this Soviet belief is evidence indicating they may have plans to reload and refire their intercontinental ballistic missile launchers after these launchers have been used to mount an initial attack.

In contrast, the American people, the Congress, and the Administration could never accept the mirror image of such a Soviet belief that nuclear war could be won in any meaningful sense of the word. But what this disparity between American and Soviet beliefs means is that we now must deal with the troublesome problem of deterring an adversary who may not share our beliefs.

To understand the rationale for including civil defense as an integral part of a strategic modernization program designed to strengthen deterrence, it is necessary to examine the factors that could support the Soviet view.

Soviet civil defenses are but one element of a synergistic multilayered protective posture. As they have been developed in the Soviet Union, these protective measures bear scant resemblance to what was termed "civil defense" in the United States.

The Soviet strategic defenses appear to have focused, in priority order, on protecting that which is of greatest value to them. The most extensive and best quality protection is that provided for the Soviet leadership. It appears to us that the Soviet leaders have prepared to survive and continue operating the country during the course of a nuclear war. To this end, they have built enough bunkers and supporting communications to far outnumber the U.S. surviving weapons, and the bunkers are hard enough to survive targeting by our most survivable warheads.

Our ability to retaliate effectively against Soviet military assets is no longer as clear as it once was. Their conventional military forces and nuclear reserves are protected by mobility. Although we could retaliate against the peacetime locations of such military units, there is doubt that such action would eliminate the fighting capability of the Soviet forces.

A major thrust of the President's strategic modernization program is to strengthen deterrence by restoring our ability to retaliate effectively against these Soviet top-priority assets, without substantially increasing the number of nuclear weapons in the U.S. arsenal.

Several years of U.S. research and testing in and out of the government have shown that the Soviet's population and industrial defenses protect them far better than we had previously thought possible. Even allowing for substantial degradation in a wartime environment, these passive defenses protect their people twice as well as any ABM system they could have built. An estimate made by the research program mentioned earlier, is that they could limit their population losses to about half of what they lost in World War II.

Their industrial protective methods have been studied and tested in the United States, and been found to reduce the lethal area of destruction for large weapons by as much as 99 percent. In one test, two complete factory buildings were set up, one unprotected and the other protected using Soviet methods. The

buildings were then subjected to blast pressures equivalent to those present within half a mile of detonation of a one megaton weapon. The unprotected factory was destroyed beyond salvage. In just three days, the protected factory was cleaned up, and its machinery was realigned, recalibrated, and ready to run.

I hope these observations have served to convey my views on civil defense. I share this Committee's concern that we must strengthen our ability to deter nuclear war.

[From the Washington Post, Editorial, Mar. 31, 1982]

AND DON'T FORGET TO WRITE . . .

Some days the news is nothing but good. Yesterday, for instance, we read that President Reagan believes the Soviets will give us notice of a week or so before firing their nukes at the old home town. Gee, that's nice of them—time for us to stock up at the Safeway, load the cat, the dog, the kids and the groceries into the car and take off for our designated "host area" in the country. Sort of like a picnic—with gridlock.

Have we missed something here? The government is going to spend \$4.2 billion over seven years on a program to relocate two-thirds of the population within a week so that 80 percent of us might survive a full-scale nuclear attack. We find it easy enough to believe that the government might allocate \$4.2 billion to this plan; we find everything else about it considerably harder to believe. Does President Reagan seriously believe the Soviets will rattle their armaments for a week before unleashing them? What are we doing in the meantime? What, for that matter, are the Soviets doing when they notice all that traffic lurching toward Lynchburg or whatever our "host area" may happen to be. That scene, you must remember, is repeated at 380 "high risk" areas in the country, including essentially all cities over 50,000, whose populations will be moved what is described as "a safe distance," 40 or 50 miles away, where they will not be affected by the nuclear blast and fire. Nobody said anything about fallout. Well, as we said, bring your own groceries.

We don't know about you, but if the sirens go off announcing the imminent end of civilization as we have known it, we're locking ourselves into the closest 7-11, where for 15 delicious minutes—or however long it takes before the final fireworks in the sky—we shall munch our way through the Hostess Twinkies, the M&Ms, and the Haagen-Dazs coffee ice cream, blissed out before the bomb. But fond as we are of Hostess Twinkies, we're not looking forward to nuclear Armageddon, and we think the administration, in its commendable zeal to protect the populace, might better focus its attention on prevention and spend that \$4.2 billion elsewhere.

[From the Los Angeles Times, Mar. 15, 1982]

CIVIL DEFENSE FOR AMERICA IS NO LAUGHING MATTER

(By T. K. Jones)

Civil defense is an issue that the American people should examine carefully, because it strongly affects the security of the United States. Such defense, however, cannot be regarded in isolation from the balance of strength or from arms-control objectives. Thus, the public should understand the reasoning that led us in the Pentagon to recommend strengthened civil defense as a part of President Reagan's program to redress the increasingly unfavorable strategic balance.

Recent news articles have discounted the serious need to safeguard humanity should an adversary choose to attack. Such discounting is a product of the long-held American theory that, if both the United States and the Soviet Union were fully exposed to retaliation, neither would attack the other. The anti-ballistic missile treaty, which limited ballistic missile defense to negligible levels, was in 1972 presented as proof that the Soviets had also accepted this theory—mutual assured destruction.

Those of us on the delegation for the strategic arms limitation talks didn't know at the time that the Soviets had a large civil-defense program, which they

upgraded as we were signing the treaty. Several years of research and testing in and out of the government have shown that the Soviets' civil defense protects them far better than we had thought possible. Even allowing for substantial degradation in a wartime environment, this passive defense protects them twice as well as any ABM system that they ever could have built.

The intellectual framework that led Americans to dismiss nuclear war as "unthinkable" has also fostered the notion that Soviet civil defense cannot possibly be effective. Some characterize the Soviet work as a "paper program," despite data indicating preparations on a scale far greater than the program outlined in the Soviet manuals. Others offer "studies" that misrepresent the content of the Soviet Union's published plans, and then claim that such poorly planned efforts wouldn't work.

It is easy to misconstrue the Soviet plans and thereby fool ourselves into believing that they won't work. Our security, however, depends not on what we might choose to believe about Soviet civil defense but on what the Soviet leaders believe about their program, and the risks that they would be willing to take based on those beliefs. In my judgment, it would be imprudent to assume that the Soviets have no faith in a program in which they are investing heavily.

The inescapable fact of Soviet strategic defense raises questions that we must answer. Can we improve our ability to deter nuclear attack by remaining unilaterally vulnerable to it? I believe that we cannot. There is no instance in recorded history where vulnerability brought strength or security.

To imply that civil defense is intended to promote nuclear war-fighting as an instrument of national policy is seriously to distort the Administration's objectives. Deterrence of nuclear war is an unalterable policy. The issue that we faced was how to strengthen deterrence. The choice was whether to make the Russians as vulnerable as we are, or to make ourselves as survivable as they are.

Making the Russians as vulnerable as we are would restore the "mutuality" of mutual assured destruction. We could do that by building about 10,000 more weapons to overpower the Soviets' civil defense. These, with their delivery systems, would cost well over \$100 billion. The most unacceptable aspect of this option, however, is that such an attempt to overpower Soviet civil defense would be incompatible with the Administration's goal of reductions in nuclear weapons.

A more sensible alternative is to deter war by making it futile. We would counterbalance Soviet defenses by protecting the American people. Even if such civil defense were to cost the \$10 billion that recent critics claim, it is a bargain compared to the price of more weapons, and is a humanitarian rather than a barbaric approach to national security. It is better to spend a little money to save a lot of Americans than to be forced to spend a lot more money to build more weapons.

Some have criticized evacuation as an infeasible method in an age when missiles reach their targets in minutes. This overlooks the fact that the Soviets plan to evacuate their people before the shooting starts. The United States, with its transportation advantage, could then get its people evacuated before the Russians would be prepared to attack. One critic doesn't want to evacuate from Boston to Laconia, N.H.; the inference is that being closer to likely target areas is somehow a more reasoned choice. In a free, democratic society, no one should be denied such a choice. My concern is that the thrust of that argument, directed against the Administration's civil-defense initiatives, is to deny the option of that free choice to those of us who believe it better to be farther away from ground zero.

Neither is there any intellectual honesty in depicting civil-defense advocates as having goals fundamentally different from those who advocate major reductions in nuclear weapons. Civil defenses and nuclear reductions have the same operative effect; they cut down the destructive power of the nuclear arsenals. For example, a shelter of Soviet design that can be built in 10 hours with manual labor (we did build and test it) would reduce the lethal radiation area by 99% and the lethal blast and thermal area by 97% to 98%, a reduction far greater than is likely to be negotiable with the Soviets.

Most important, civil defense is not a substitute for reductions in nuclear weapons. My own view is that we should negotiate the nuclear arsenals as close to zero as possible, and then do everything that we can to protect our society against the nonnegotiable remainder.

[From the Washington Post, Mar. 30, 1982]

PLANS APPROVED TO MOVE CITIZENS IN WAR THREAT

(By Don Oberdorfer)

President Reagan has approved a seven-year, \$4.2 billion program to relocate up to two-thirds of the American public in case of imminent threat of a nuclear war, a U.S. agency announced yesterday.

The new program, made public by the Federal Emergency Management Agency (FEMA), which would be responsible for carrying it out, represents a large-scale increase in government activity to prepare U.S. civilians to survive an atomic holocaust. Only \$133 million annually is being spent for this purpose under existing plans.

FEMA spokesman James Holton said the new plans are based on a government assessment that a surprise nuclear attack on the United States is less likely than "a general exchange that would come out of a period of heightened international tension" with the Soviet Union. Holton said the working assumption is that the president would have at least a week's advance notice to move Americans from 380 "high-risk areas" to an unspecified number of "host areas" throughout the country.

The "high-risk areas" for a nuclear exchange, according to Holton, include 61 "counterforce targets" such as U.S. missile fields, strategic bomber bases and ports for nuclear submarines, and 319 cities—essentially all U.S. cities over 50,000.

Designation of the "host areas" where Americans could find shelter from radioactive nuclear fallout under the plan is being left to the states, Holton said.

It is not anticipated at this point that the fallout shelter areas would be stocked with food, as in the abortive Kennedy administration program of the early 1960s, the last time that the U.S. government contemplated large-scale civil defense operations and expenditures. Some of the "host areas" probably would have readily available food supplies, and "we might ask people to take food with them," Holton said.

There was no explanation from the White House, which arranged for the program to be announced by the little known FEMA, about why Reagan had decided on a large-scale upgrading of emergency preparations at this time. However, Reagan and other administration figures have expressed the view that the Soviet Union is better prepared for a nuclear war than is the United States, and some have stated that even an all-out nuclear exchange could be "survivable" with advance preparations.

One of the four objectives in the National Security Decision Directive signed by Reagan and made public yesterday is to provide for the survival of "a substantial portion" of the American public and government continuity in nuclear war.

No figures were attached, but Holton said the plan's objective after the seven-year effort is to double the number of Americans who would survive a nuclear attack. Since present calculations are that about 40 percent would survive a full-scale attack, he said, the objective is an 80 percent survival rate.

The other three objectives in Reagan's order are enhancement of strategic "deterrence and stability," including maintenance of "perceptions" that the international strategic balance is favorable to the United States; reduction of the possibility that the United States could be "coerced" in a crisis, and improvement of the government's ability to deal with natural disasters and other unspecified "large-scale domestic emergencies."

Reagan is reported to have approved a greatly expanded civil defense program in principle during a National Security Council meeting last Dec. 3. The Office of Management and Budget reportedly opposed the plan, arguing that it would cost far more than officially estimated.

The seven-year program, which Holton said has been paid by FEMA at \$4.2 billion, calls for planning and "deployment" in countryside areas of such evacuation support facilities for civilians as communication systems, radiation detectors, organization for medical support and food distribution. This should make possible "a resuscitation of life" after a nuclear attack, Holton said.

The program also envisions construction of blast shelters for "key industrial workers" who would remain in high-risk areas during a nuclear crisis and

unspecified protection of "key defense and population relocation support industries." As now approved by Reagan, the plan does not include major funding for these purposes.

Senator PRESSLER. Thank you, Mr. Jones.

We will have one round of questions for each Senator, and then we will open up the hearing to further testimony from Mr. Perle and anyone else.

Mr. Jones, the first question that I have is this. In a January interview with the Los Angeles Times, you said that the United States could recover fully from an all-out nuclear war with the Soviet Union in just 2 to 4 years if it had a Soviet-style civil defense. You reportedly said: "Everyone's going to make it if there are enough shovels to go around." What is the basis for your assessment that the United States could recover in 2 to 4 years.

Mr. JONES. As I indicated in my opening statement, Senator Pressler, I have not made an estimate of U.S. recovery, given Soviet-style civil defenses. Such estimates are extremely complicated to make. My estimate of Soviet recovery involved the work of a group of economists who specialize in Soviet economy, along with a number of experts on industrial operations, people who understood how we might target the Soviet Union, and who, of course, do not have comparable understanding about how the Soviets might target the United States. Attempting to extrapolate an estimate of U.S. recovery from that complex, technically complicated modeling and analysis of Soviet recovery is not feasible. To have made a comparable estimate for the United States, we would have had to examine targeting from the Soviet perspective, taking into account the expertise of economists who understand the U.S. economy, instead of specialists in the Soviet economy and things of that nature.

I might add that in the material I provided the Joint Committee on Defense Production several years ago, I am on record as pointing out that, given our current lack of protection for our society, the recovery time to a prewar gross national product in the United States would be something longer than 12 years. The reason we said it was longer was because that long a recovery time beyond the capability of the model to accurately predict. Given the degree of destruction we would have without protection, we did not feel we could come up with a precise estimate.

Senator PRESSLER. I see. You were quoted as Deputy Under Secretary of Defense for Strategic and Theater Nuclear Forces in this article. I guess the concern is, is this a responsible position, the administration's position, or your beliefs, or were you misquoted? When I read from this article, you said, according to the article,

"Everyone's going to make it if there are enough shovels to go around." The shovels are needed, he said, to build primitive shelters in the countryside for the evacuated urban population. Jones' idea is, dig a hole, cover it with a couple of doors, and then throw three feet of dirt on top. It's the dirt that does it.

Is that your view of civil defense?

Mr. JONES. Senator, if I could point out a couple of things pertaining to the interview. Public Affairs agreed to the interview with the author of the article, based on his request to examine Soviet civil defenses and how civil defenses related to the strategic forces modern-

ization program. He also indicated the purpose of this interview was in conjunction with an article he was doing on some statements being made by the Physicians for Social Responsibility.

He obviously did not confine himself to the subject or purpose of the interview. Although I suggested that the author contact Mr. Perle to get the administration policy on this matter, he did not do that. I believe, then, that because he did not talk to Mr. Perle, he certainly could not say that he had a policy view from any administration source. I have an agreement with Mr. Perle that he is responsible for policy. I do not formulate policy and he does not practice engineering.

Senator PRESSLER. So, in other words, you were speaking for yourself on this occasion?

Mr. JONES. That is not what I said, Senator.

Senator PRESSLER. Well, then, I want you to clarify it.

Mr. JONES. My point is, I was not making policy statements on that occasion. I would like to respond to the quotations you cited if you have no objection. They were excerpts of a detailed, technical conversation about the way Soviet shelters are designed and built and how they operate. The statement about digging a hole and covering it with doors refers to a shelter designed by a group of experts at the Oak Ridge National Laboratory. Their purpose was to modify Soviet designs by using materials more readily available in this country. It is calculated by them that such a shelter will cut radiation intensity by a factor of 250 but as they expected and as tests confirmed, it offers only modest blast protection.

I might add that those blast protection tests used the same basic technology that is used to test Minuteman silos, launch control centers, and other systems that we need to make survivable.

The statement, "Everybody's going to make it," obviously is not correct. The sentence which followed that pointed out that not everybody survives any war. Some people do not survive. The point is that sheltering people does improve the odds. The reference to shovels refers to the kind of tools that are used to build Soviet civil defense shelters.

There are 25 or 30 different shelter designs that are published in Soviet literature. They are not perfect designs. A number of them have been analyzed carefully by structural design experts in the United States, some within the Boeing Co., some within TRW, some within the Federal Emergency Management Agency, and some within the Defense Nuclear Agency. The Soviet designs have been very well analyzed.

The reason for the large number of Soviet designs is that they want to take advantage of whatever materials are at hand if and when they decide that they need to evacuate their people and shelter them.

According to Soviet manuals, they can build these shelters with hand tools in about 10 hours. Several of these designs were built in the United States using the Soviet designs and methods. The labor hours expended were consistent with those listed in the Soviet manuals. We did test these shelters, Senator, using the same kinds of test methods we used to check the survivability of Minuteman silos. We found that the effectiveness of these shelters was far better than we had thought in the calculations. They survived overpressure levels of about 100 pounds per square inch.

That would have the effect of reducing the lethal area of large nuclear weapons due to blast by 97 percent. It would also reduce lethality due to thermal and burning by 98 percent, and it would reduce the lethal area due to radiation by 99 percent. Those are fairly significant reductions in the destructive power of nuclear weapons that are achievable by fairly simple devices.

[The following material was subsequently received for the record:]

I would like to extend my remarks to note my surprise that this committee would question the utility of dirt as a means of protection from nuclear effects. The Office of Technology Assessment study sponsored by this committee on the Effects of Nuclear War stated that radiation "... could be attenuated ... if about 18 inches of dirt could be piled against windows and exposed walls (of a basement) before the fallout begins. Thirty-six inches of dirt would reduce the dose to a negligible level ..."

Senator PRESSLER. When you speak or give an interview, and you are Deputy Under Secretary of Defense, does anyone in DOD clear your speeches or interviews?

Mr. JONES. Yes, they do, always.

Senator PRESSLER. So, in other words, when you did the interview with the Los Angeles Times, that was cleared?

Mr. JONES. The Public Affairs Office brought the Los Angeles Times person to my office, and they requested that I interview with them.

Senator PRESSLER. I see.

We have another vote. The chairman of our committee is here and has not yet had a chance to speak. Let me say, Senator Percy, that after a round of questioning, we will hear from other witnesses.

The CHAIRMAN. I have no questions. I consider it most appropriate that Assistant Secretary Perle, who does speak for the Department, will be heard. I will not ask any questions until Secretary Perle is heard, and I will have questions of both Secretary Perle and Mr. Jones. I think probably we should go over to cast our votes now. It is just about over.

Senator PRESSLER. Please excuse us. We will recess for about 5 minutes.

[Whereupon, a brief recess was taken.]

Senator TSONGAS [presiding]. May we reconvene?

[Pause.]

Senator TSONGAS. Mr. Jones, what I would like to do is take us through a situation involving a particular community, to see how things work themselves out. Let us take New York City. The kilotonnage of the weapons that were exploded over Hiroshima and Nagasaki were in the 12- to 20-kiloton range. If my mathematics is correct, a 1-megaton weapon is—maybe it would not be a bad idea to drop one over that bell system. I realize it is hard to justify continuing discussion on nuclear war when the tax deduction is on the Senate floor, but we will wend our way through as best we can.

A 1-megaton Soviet weapon is 50 times larger than that exploded on Nagasaki, which was larger than the one exploded on Hiroshima. Now, let us take New York City, within the city limits. How many Soviet warheads do you believe are targeted at New York City? I know you do not know exactly, obviously. But given your position, what do you think the range is?

Mr. JONES. Senator Tsongas, the civil defense measures of New York City are the responsibility of the Federal Emergency Management Agency and not the Department of Defense. They are certainly not the responsibility of my office. I can tell you how effective Soviet shelters are and how effective they are against U.S. weapons, which I should point out are, on the average, only one-third the yield of Soviet weapons. That is the reason why the Soviets have a much easier task in protecting their people than we would.

Senator TSONGAS. Do you mean to tell me you have no idea of how many weapons would be targeted by an aggressor on New York City, even roughly?

Mr. JONES. I do not know that, sir.

Mr. TSONGAS. How about Washington?

Mr. JONES. Again, it is FEMA's responsibility to talk about how to protect Washington. How many weapons the Soviets target is something that no one in the United States can know. We do not know that. They know it. We do not.

Senator TSONGAS. Well, how do you know where to pile the dirt if you do not know where the bombs are going to be dropped?

Mr. JONES. Senator, the principle of protecting people is that shielding reduces lethal area. I had previously given the chairman figures on how effective those protective measures are. They reduce the lethal area due to blast by 97 percent. They reduce lethal area due to thermal effects which cause burns on people, by 98 percent. They reduce radiation by 99 percent.

Senator TSONGAS. How deep is the crater created by a 1-megaton bomb?

Mr. JONES. The crater depth is not what matters here. What matters is the amount of and the ability of shelters to protect against it. The figure I quoted for the ability of shelters to reduce lethal area was from a 1-megaton weapon. The United States has very few 1-megaton weapons that would survive a Soviet attack.

Senator TSONGAS. Wait a minute. The United States would have very few nuclear weapons that would survive a—

Mr. JONES. Senator Tsongas, what I said was in reference to a 1-megaton nuclear weapon. The United States would have very few weapons of that size surviving a Soviet attack. Most of our surviving weapons would be much smaller than that.

Senator TSONGAS. What would happen to them?

Mr. JONES. Most of our high yield weapons are in silos, as I am sure this committee is aware. Silo survivability is a matter of serious concern.

Senator TSONGAS. So your judgment is the United States would not fire them, would not launch upon detection of a Soviet strike?

Mr. JONES. I would say there is substantial technical difficulty in doing that. As to whether that is a matter of policy or not, I would defer to Mr. Perle.

Senator TSONGAS. Do you think that first strike is a feasible Soviet alternative?

Mr. JONES. It does not matter what I think, Senator. Our security is affected by whether the Soviets think it might be feasible. There are indications in the Soviet literature that they think it might be feasible.

Senator TSONGAS. You said earlier that you are an engineer. Are they correct?

Mr. JONES. The pros and cons of a first strike involve value judgments, Senator, that are beyond the science of engineering. The kind of value judgments inherent in the nonengineering aspects of a nuclear first strike certainly do not coincide with mine, and I sincerely believe they do not coincide with your value judgments either. I doubt that the Soviet value judgments underlying their statements that they could fight and win a nuclear war would coincide with any American's value judgment.

Senator TSONGAS. When we began the discussion, you made it very clear, you did not want to talk about policy issues, you wanted to talk about technical issues. We are not engaged in a discussion of metaphysics here. We are in a discussion of technical points. Is, technically, from an engineer's background, a first strike launched by the Soviet Union against the United States feasible from their point of view? Is it technically feasible?

Mr. JONES. On what standard do you measure feasibility, Senator? If you will set out that standard, I will tell you whether it is feasible. I do not know what standard you are imposing, and I am not sure exactly what standard the Soviets would impose. Technical feasibility is a matter of precise measurement against a defined standard.

Senator TSONGAS. Well, let me give you a standard, that the Soviet Union, post that kind of a strike, could get its GNP back to prewar conditions in 4 to 6 years. Let us use that standard. That is your standard.

Mr. JONES. That is technically feasible, as was determined by a task force of people, including economists, military advisers, and people from industrial engineering and production management backgrounds. Some critical data points subject to uncertainty and those were confirmed by tests. From this combination of test and analysis it was determined that it was feasible for the Soviets to meet the standards you described.

Senator TSONGAS. So a Soviet planner can go up to Brezhnev and say, Mr. Brezhnev, if you are willing to endure a loss of GNP for 4 to 6 years, we can engage in a first strike against the United States. That would be a viable option, given that definition of viability. Return to GNP within 4 to 6 years?

Mr. JONES. I would trust that Soviet military planners probably do what U.S. military planners do, Senator. That is, they would present as factual a case as they could. The policy judgment on the matter would be left to Mr. Brezhnev and the Politburo.

Senator TSONGAS. But that would be the technical recommendation? The technical analysis?

Mr. JONES. The technical facts, yes.

Senator TSONGAS. Let me reverse it. You said the United States, if it pursues a Soviet-style protection program, could be put back together in a reasonable 2- to 4-year period. Let me reverse it. Can the United States—

Mr. JONES. If I might correct that, Senator, it was alleged that I said that. I was quoted in the press as saying that. As I pointed out in my opening statement, I have not made such an estimate.

Senator TSONGAS. How long would it take?

Mr. JONES. I have not estimated how long it would take, Senator. That is a very complicated analysis and one cannot simply extrapolate from an estimate of Soviet recovery to an estimate of U.S. recovery.

Senator TSONGAS. Do you not think it would be proper to do the analysis first and then make your statement second?

Mr. JONES. I did not make the statement, Senator. I have made statements about Soviet recovery after the analysis was done. The only analysis I have done on U.S. recovery was based on our present lack of protection, the economists did that and found that without protection the level of damage was so bad that it was beyond the capability of the model to precisely estimate recovery. It was somewhat beyond 12 years, but how much further beyond we did not know with any degree or precision.

The other point that must be restated refers to the caveats on that kind of analysis. The analysis was based on restoration of the level of productivity to the prewar gross national product. It did not in any way imply that all the damage had been set straight, and it certainly would not have been. It certainly did not imply that a nuclear war was anything less than a terrible catastrophe.

Senator TSONGAS. It has been estimated that there are 60 nuclear weapons targeted—this is in private sector publications; I am not being secret about it—that there are 60 U.S. nuclear warheads targeted on Moscow. The estimate is that nothing would be standing within the city limits of Moscow. Let us take the hypothetical. They tell their people to march out, to go as far as you can in a day.

Now, I find it rather intriguing that you could have a U.S. Ambassador sitting in Moscow who looks out the window and sees everybody streaming out of the city without calling up and saying to somebody, there is either a very good soccer game going on or something is up. They all stream out. We without retargeting drop 60 nuclear weapons on Moscow. Nothing stands in the Moscow city limits. They cannot feed their people anyway, even under optimal circumstances. What happens to those people, and what do they then do, and where does the food come from?

Mr. JONES. There are two or three points that you mentioned, Senator. Let me cover each of them.

In my report to the Joint Committee on Defense Production in 1976, I pointed out that a Soviet evacuation of their cities would give several days' warning. In all of the analysis work that I have done, we took that into account, and therefore assumed that the U.S. forces were in what is known as fully generated alert. Namely, all the ballistic missile submarines not in drydock or major overhaul would be at sea, and thus we assumed that they were totally survivable. Bombers would be distributed to their dispersal bases. It was assumed that all U.S. warning systems would remain intact even though, as I think most of us know, that is a very optimistic assumption.

The tanker aircraft essential to bomber penetration were arbitrarily assumed to survive, even though the calculations would show that that is terribly optimistic. The attack on U.S. ICBM's was limited to no more than one warhead per silo, and therefore a lot of those would survive.

Mr. Chairman, should I proceed with that answer, or should I wait for Senator Tsongas to return?

Senator PRESSLER [presiding]. Please proceed. We are rotating on our votes to keep this hearing going.

Mr. JONES. As to the matter of retargeting, General Doyle is more expert on that than I. The people with whom I consulted on this subject, who did have that particular skill, pointed out that there are some very serious technical limitations which we should probably not go into in open hearings.

One of the other points that you mentioned is that the Soviets cannot feed their people. That is incorrect; what is at issue is the quality of the Soviet diet. The Soviets, on the average, produce about 180 million metric tons of feed grain per year. Of that, their population consumes only about 60 million metric tons, with 30 million additional being required for replanting next year's crop.

In the aftermath of a nuclear war, their grain production could be expected to go down somewhat, but not below the tonnage required to feed their people. The data on the resistance to radiation effects of crops is very thoroughly portrayed in Soviet literature. Ironically, they are using data taken from U.S. sources to plan their own civil defense work.

Radiation damage could require the Soviets to feed their cattle on grass instead of grain, but that does not mean that any of the Soviets would starve.

A more serious matter is the misconception that the Soviets would simply walk their people out into the countryside. The Soviets have planned their civil defenses in a most meticulous manner. The destination of evacuees is prearranged. They go to specific destinations which in most cases are the state and collective farm areas. A major reason for that is that those areas have the resources necessary to support evacuees. Much of the food in the Soviet Union is stored in the state and collective farm areas. Evacuating the urbanites to the farms would ease what otherwise would be very troublesome food distribution problems.

In sum, we cannot correctly say that the Soviets would starve themselves or that their civil defense plans are poorly constructed.

The CHAIRMAN. Mr. Chairman, I would prefer to defer my first round of questioning until after Secretary Perle has testified. I would ask that I be recognized at that time, after he has finished his testimony, so why do you not finish your questioning now, and then I can proceed.

Senator PRESSLER. I have two or three more questions. Senator Cranston may or may not be back on time. But we would perhaps yield to him later, if that is agreeable. He does have several questions.

Mr. JONES, according to an article you wrote in 1978, you used up to 500 tons of TNT to test the effect of explosions on industrial equipment. That meant your largest explosion was about one twenty-fifth the size of the Hiroshima explosion, and only one one-hundredth or one one-thousandth the size of current warheads. How can you believe that such experiments can lead to any realistic conclusion, particularly since the excessive heat generated by a nuclear explosion gives it a character unlike any other detonation?

Mr. JONES. Senator, the simulation of nuclear weapons effects by use of high explosives is a proven technology. The scaling laws that are

used were derived from above-ground nuclear testing back in the era when we were permitted, under international agreement, to run such tests.

In its most simple form, the test is run by mounting the explosive very close to the test article so that the overpressure created by a relatively small explosion would simulate the overpressure at the appropriate distance from the larger nuclear weapon. It does not, however, duplicate the time duration of the pressure pulse. For that reason, the technical community used a type of test known as HEST, where test articles are covered with a layer of explosive which is detonated in sequence. There are several feet of earth overburden placed on top of the explosive charge.

There have been several such tests on Minuteman silos, and the technical community believes that they are quite valid. I do not know that the United States has ever tested civil defense shelters in direct exposure to nuclear effects. They have run high explosive tests on them. On the other hand, in Andre Sakharov's book there is a passage that indicates that when the Soviets were running above-ground tests with thermonuclear weapons, they did test some of their civil defense shelters, and the shelters were occupied with people.

As to your point about the thermal effects: The data on thermal effects is very well documented from the above ground nuclear tests. The Soviet literature includes such data. Their method is to reduce the amount of combustible material in the area of their shelters. There are a number of operating procedures for management of the atmosphere within the shelter in the event that there was a fire. The amount of earth needed for radiation and blast protection is sufficient to insulate from other thermal effects.

Senator PRESSLER. Do you believe that nuclear war is winnable?

Mr. JONES. No, sir, I do not.

Senator PRESSLER. You do not?

Mr. JONES. No.

Senator PRESSLER. If there were a first strike, do you feel we could get back to normal in 2 or 3 weeks? If we had a first strike that destroyed them, would we not win under those circumstances?

Mr. JONES. I am not sure I understand that question. Would you mind repeating that, sir?

Senator PRESSLER. Yes. I believe you say you do not believe that a nuclear war is winnable, yet you have said that we could recover from a first strike in 2 to 4 weeks. Is that not correct?

Mr. JONES. No. Your question, Senator, may refer to an industrial area analysis. By using Soviet protective methods, the estimate was that we could restart production in 4 to 12 weeks; the 4-week time period being a case where the Soviet weapons were airburst, the 12-week case being where the weapons were ground burst and would create a radiation environment that would have delayed restart.

That estimate was made by the industrial engineering staff of the Boeing Co. The gentleman that led that team was the guy who built the 747 plant. He was able to build a factory from bare ground and get the first airplane rolled out the door in 30 months. He has a reputation of being able to meet his schedule commitments. He, along with the team that did the blast tests, provided that estimate and it

was done in consultation with the utilities in the area. Utilities would have been the pacing item in such a restart period.

A conclusion of the regional analysis was that he could get back to his then level of production, which I believe was on the order of 50 percent of full capacity, in approximately 1 year.

Senator PRESSLER. My final question is, would you describe what your view would be of life in the United States after an all-out nuclear exchange 1 month after it occurred, and then 1 year after it occurred, and then 5 years after it occurred namely, an all-out nuclear exchange.

Mr. JONES. That is a U.S. question. I would refer that to the Federal Emergency Management Agency if I may, sir.

Senator PRESSLER. All right. I have concluded my round of questioning. I know that Senator Cranston will be coming back with more questions. I know that Senator Percy wants to ask Mr. Perle some questions. Would it be agreeable to you, Senator Tsongas, if we heard Mr. Perle, then had Senator Percy ask his questions, and then go back to Mr. Jones?

Senator TSONGAS. Yes.

Senator PRESSLER. Very well. I will now call on Mr. Perle for his opening statement, but we do still have more questions for Mr. Jones.

TESTIMONY OF HON. RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE, INTERNATIONAL SECURITY POLICY, DEPARTMENT OF DEFENSE, ACCOMPANIED BY BRIG. GEN. WILLIAM J. DOYLE, JR., DEPUTY DIRECTOR, NATIONAL STRATEGIC TARGET LIST DIRECTORATE, JOINT STRATEGIC TARGET PLANNING STAFF, AND WILLIAM CHIPMAN, DIRECTOR OF CIVIL DEFENSE PROGRAMS, FEDERAL EMERGENCY MANAGEMENT AGENCY

Mr. PERLE. Thank you, Mr. Chairman.

Senator Percy, thank you, as chairman of the full committee.

I am pleased to testify before this subcommittee on the Defense Department view of the administration's Civil Defense Program.

As you are doubtless aware, the Department of Defense and the National Security Council share responsibility for oversight of the Federal Emergency Management Agency's Civil Defense Program. Within the Department of Defense, this oversight responsibility falls under the Under Secretary of Defense for Policy, and it is at his request that I have been designated to appear before you today.

At the subcommittee's insistence, I am accompanied this afternoon by Mr. T. K. Jones—the Deputy Under Secretary of Defense for Research and Engineering—whom you have already had an opportunity to question. In light of the misunderstanding that has arisen over remarks attributed to Mr. Jones, and recalling my previous appearance before the subcommittee, it might be useful to comment briefly on the internal organization of the Department of Defense with respect to civil defense.

Statements on Defense Department policy with respect to civil defense are the responsibility of the Office of the Secretary and specifically the Under Secretary for Policy. The development and ad-

ministration of civil defense policy has been assigned to the Office of the Deputy Under Secretary for Policy. While we may turn for technical advice to the military services or the Office of the Under Secretary for Research and Engineering, these organizations are not responsible for either the formulation or articulation of Department policy.

As it happens, Mr. Jones conducted research and analysis on the Soviet civil defense program in his civilian capacity before joining the Department of Defense. He already has had some opportunity to describe some of that research activity. He is a highly skilled engineer and analyst who has had substantial experience in the technical aspects of the protection of people and property with respect to nuclear effects.

He has made an important contribution to the technical literature on this complex subject. He is a careful, thoughtful, and dedicated public official. Those of us responsible for Defense Department policy have benefited from the results of Mr. Jones' research on a number of subjects, including civil defense. Mr. Jones does not, however, speak for the Defense Department on civil defense matters, and any views he may have expressed that have been construed as policy statements on civil defense are his own, and not necessarily those of the Department of Defense. Furthermore, it is clear that much of the misunderstanding has resulted from a misinterpretation of what Mr. Jones actually has said.

I had the honor to serve on the staff of the U.S. Senate for more than 10 years, and in a decade of experience with the press, came to appreciate the need occasionally to take shelter. I even learned something of the rapidity with which the prevailing journalistic winds can carry verbal fallout to great distance. Above all, I came to understand how easily a colorful phrase can encourage a chain reaction that culminates in an explosion of misunderstanding.

I am here today, along with Mr. Jones, to resolve any misunderstanding that might have arisen as the result of remarks made by Mr. Jones—remarks that were never intended to articulate policy and that have been misunderstood by this administration is callous or unrealistic about the awesome consequence of nuclear war. We are not.

We understand that the horror of nuclear war is beyond analogy and beyond human imagination. We are determined to do everything in our power to prevent it.

In my years on the Senate staff, I learned something else. I learned that clarity in the development of a public record on great issues of public policy is essential to our democracy. I know that this subcommittee would never deliberately propagate confusion or misunderstanding in the public record.

I welcome this afternoon's hearing, for I am confident that, at its conclusion, you will join with the administration in rejecting the notion that the United States believes that a nuclear war could be, in any intelligible sense of the word, won by either side. No civil defense program that I could imagine would alter that sobering fact.

I only wish that one could demonstrate that the Soviet Union, whose civil defense program dwarfs our own, shares this basic administration view.

The misunderstanding that has arisen about the administration's view of civil defense distorts the public record at home and is damaging

to our country abroad. We welcome and we appreciate your help in dissipating any anxieties to which that misunderstanding has given rise.

A little more than a year ago, in testimony before the House and Senate Armed Services Committees, we indicated that civil defense was one of several issues undergoing an intensive administration review. Following that review, a decision was made to increase the resources devoted to civil defense, to expand the program on a national basis, and to lay the groundwork for correcting deficiencies in previous programs. That decision was announced last October as part of the President's program for reversing the adverse trends in the strategic balance. More recently, it has been established in a national security decision directive which has replaced PD-41 as our national civil defense policy.

I suspect that most of the questions that you will have about the administration's civil defense program can best be answered by the Federal Emergency Management Agency. I wish to make only three brief points.

First, the administration's civil defense program is consistent with, and intended fully to support, our fundamental strategic policy which is to deter the use of nuclear weapons by maintaining a stable balance of strategic forces. We do not seek nor do we believe that it is possible to obtain levels of protection from the effects of all-out nuclear war that would reduce significantly the unspeakable horror of such an event. But neither do we believe that we can in good conscience make a deliberate decision to refrain from even those minimal plans for expedient measures that might diminish the loss of life that a nuclear war would entail.

Our considerable effort to maintain a strategic balance, including the President's modernization program, is intended to enhance the stability of our deterrent posture. The modest measures we are proposing for civil defense represent little more than insurance, insurance that, in circumstances short of a central nuclear exchange, some lives might be saved that otherwise would be lost. If deterrence should fail, if an accident or an unauthorized attack should take place, if a limited strike were ordered in a condition of crisis and attendant miscalculation, we believe that we ought to have some capability, however limited, to mitigate the consequences for the American people.

Second, we believe that the scope and magnitude of the Soviet civil defense effort implies the seriousness with which they regard protection against nuclear attack. We cannot, of course, make confident judgments about the efficacy of the Soviet program or perhaps more to the point, the beliefs held by the Soviet leadership of the efficacy of that program. We do know that they have for many years sustained an extensive program of civil defense. A modest program of the sort the administration proposes may help to dispel any possible delusions the Soviet leadership might harbor today or in the future that they can exploit the absence of any civil defense program in the United States to deepen our sense of vulnerability and thereby intimidate the United States.

Third, we reject categorically the argument sometimes heard that even a modest civil defense program will lead us to a false and reckless sense of security. I do not allow my 2-year-old to play with matches just because I have fire insurance. And I can assure this com-

mittee that the prudence that characterizes the administration's approach to strategic policy will in no way be diminished as a consequence of our efforts partially to mitigate the destruction that would result from a nuclear detonation.

The Department of Defense supports the Federal Emergency Management Agency's request for fiscal year 1983 to begin a modest and measured program of civil defense.

In conclusion let me state that we have been especially anxious in light of the very damaging perception perpetrated in many cases by those who are not friends of this country to dispel the incorrect notion that we are careless or reckless about nuclear war. We welcome a chance to put that to rest, Senator, and we appreciate your willingness to hear our position. Thank you.

Senator PRESSLER. I will yield to Senator Percy.

The CHAIRMAN. Thank you very much.

I think it has been very helpful to have your statements today, both your statements, because there has been some confusion as to what capacity Mr. Jones has been speaking, in particularly when he signs an Op Ed piece with his title on it. It may appear then as though he were stating official doctrine.

I think you clarified, Secretary Perle, that you have come here today designated by the appropriate Under Secretary to speak for the Secretary as the official spokesman on civil defense matters.

Is it true, Mr. Jones, that in recent interviews you were speaking in a personal capacity, expressing views that you long held while at Boeing, and the views which you expressed to the Los Angeles Times on March 4 and to NBC when you reconfirmed what you had said before, and subsequent statements that you had made, that in these instances you were speaking in a personal capacity? Is that correct?

Mr. JONES. First, Senator, I have to say that the author of the Times article took considerable liberties—

The CHAIRMAN. I am sorry. I cannot hear you. Were you speaking in your personal capacity or were you speaking officially for the Department of Defense?

Mr. JONES. In the Times article, Senator, the author took considerable liberties with what I said.

The CHAIRMAN. Were you speaking in your personal capacity or for the Defense Department?

Mr. JONES. The interview was arranged by the Department. I spoke in my engineering capacity. As Mr. Perle has indicated, I do not speak on policy matters for the Department.

The CHAIRMAN. So the answer to my question is, you were speaking in a personal capacity?

Mr. JONES. Yes, sir.

[The following information was subsequently supplied for the record:]

The OpEd piece, which the Chairman noted was published with my title, was reviewed before submittal by the cognizant offices in the Department of Defense.

The CHAIRMAN. That is fine.

Senator TSONGAS. Would the chairman yield?

The CHAIRMAN. Yes, but just briefly, because I have people waiting in my office that I have to see.

Senator TSONGAS. Mr. Chairman, it insults my intelligence for us to be told that he goes out—he is an official of this Government, a high-ranking official. He goes out and makes these statements, and under questioning tries to pretend that those were personal judgments that would not reflect on the administration.

The CHAIRMAN. Well, I said that my disagreements or misunderstandings or unhappiness with Mr. Jones are well known to him.

First, there was his refusal to appear before this committee. No one refuses to appear as long as they want to stay in the administration when a committee asks him to appear. That is a condition of being there. You are subject to call by the Congress, and this committee has clear jurisdiction in this case, and we would have issued a subpoena immediately to authorize his appearance here should he have again refused.

That was my first disagreement, which I then expressed when Mr. Jones and I appeared publicly 5 or 6 days afterward at a town hall meeting in my hometown of Winnetka. There he was, and we couldn't even get him before this committee. I certainly backed up the chairman of this subcommittee in saying he should be here, and in subsequent conversation he readily agreed to appear. I appreciated that, though I could not quite understand the on-again, off-again situation from other people in the Defense Department as to whether he should come or not.

But then, the question was, was he speaking for the Department, and I think the moral of the lesson really is, we all have to be extraordinarily careful. I have found that I have to make it eminently clear when I am speaking as the chairman of this committee and when I am speaking as a Senator, not for the committee.

In this case, Mr. Jones has pointed out very clearly in his testimony the misleading nature of the Soviets who have written books on the winnability of war. I sat confronting the whole bunch of them, Ustinov and every member of their Joint Chiefs of Staff for hours in the Kremlin, questioning them as to whether they really felt a war was winnable, and I challenged them to prove it if they thought it was, because it defied any logic or anything I have understood about the problem, but the problem we had with the statements that Mr. Jones made is that it appeared as though war, nuclear war was credible.

It is thinkable, it has been thinkable since Kahn wrote his book, but it is not credible to think that we could really survive, and that is where I had strong disagreement, but I again express my appreciation that Mr. Jones was there before my crowded hall, and I was glad to have an administration official present to see what is happening. I wish other officials could see what is happening, because he came away from that meeting understanding what we hear from our constituents every weekend we go back home.

This is a grassroots movement on nuclear war. General Doyle, with all due respect to you, we have long had the policy that war is too serious to be left to generals. This is why we have civilian control. The arms control movement now seems to be saying that nuclear war is now considered too serious to leave to governments.

People in Europe are beginning to speak out and demand we do something about it, and these town hall meetings—I never thought

I would ever see on the North Shore of Chicago a meeting such as we saw there, people sitting jammed into this school for hours, to just express their dread of what direction the world is going in and what politicians are going to do about it. We had better do something about it.

We have strongly urged the President to speak out forcefully for the administration on this, and at 8 o'clock tonight I think he will express himself in a statement on this very issue. He is the best spokesman for the United States, and that will be the official position. I think we will be able to support that position. I hope we will.

Have you read Jonathan Schell's article in the New Yorker?

Mr. JONES. I have read a summary of the article, Senator, but have not studied it in detail.

The CHAIRMAN. Do you think that he is correct or even half true in the consequences that he pictures for the world if there is an all-out nuclear exchange?

Mr. JONES. Mr. Schell has certainly created graphically a horrible picture of the consequence of that exchange, as have the physicians for social responsibility.

One should certainly never dispute that a nuclear exchange would be horrible. With the kind of values we cherish in the United States, we should never, ever accept that as a prospect. As you and I discussed in Winnetka a week or so ago, we agreed along with your constituency that deterrence was an absolute requirement. The technical aspects of Mr. Schell's assertions, however, are almost entirely speculative insofar as environmental and ozone damage are concerned. We simply do not know the answers to those things.

The National Academy of Sciences, as you will recall, ran a very comprehensive and well-documented study. They pointed out that many of the things that we had previously believed about global effects of nuclear war were not true. On the other hand, there were a number of unknowns. Speaking for myself as an individual, I hope we never find out.

The CHAIRMAN. On reflection, do you really think, though, in the statements that you made in January in the Los Angeles Times, that you reiterated again to NBC on March 4, do you think that you are adding to the clarity of this subject when you say that in 2 to 4 years we can recover from an all-out nuclear attack, and mention the fact that we should all have shovels to dig 3 feet, or put 3 feet of dirt over us? I do not know how long you can stay under 3 feet of dirt and survive, but you repeated this.

What percentage of the arms control community and the defense community would you estimate would actually agree with your conclusions about U.S. survivability in the event of an all-out, I repeat, an all-out nuclear exchange? What other people would agree with you? What percentage of the community would agree with you?

Mr. JONES. Well, Senator, I would not agree with that statement, because I did not make it.

The CHAIRMAN. You deny that you made the statement to the Los Angeles Times?

Mr. JONES. I did not make a statement on U.S. recovery, given a Soviet-style civil defense program, because I have not analyzed that

particular case. I simply cannot make a statement that I have not supported by analyses, and recovery analyses are too complex to be run by any one individual.

As I indicated to the committee chairman in my opening remarks, I have estimated, based on Soviet civil defense preparations, what their recovery time could be.

The CHAIRMAN. Let me give you the exact statement which you stated to the Los Angeles Times in January, that the United States would recover fully from an all-out nuclear war with the Soviet Union in just 2 to 4 years if it had a Soviet-style civil defense. " 'Everybody's going to make it,' he observed during the interview, 'if there are enough shovels to go around.' "

We have reconfirmed with the Los Angeles Times, and they will certify that those were statements made by you. Did you make those statements, and if you did, do you still believe those statements, and if so, what percentage of the knowledgeable people in the field of civil defense and disarmament and arms control concur with you? Because I sat at that school before 1,500 people, and I know of no other responsible official in this administration, in the White House, Defense Department, or State Department, who would concur with those statements. Therefore, I concluded you were speaking on your own behalf.

Mr. JONES. I did not make the statement that the United States could recover in 2 to 4 years. I have stated that my analysis showed that the Soviet Union could recover in 2 to 4 years.

The CHAIRMAN. According to the Los Angeles Times, you said the United States would recover fully from an all-out nuclear war with the Soviet Union in just 2 to 4 years if it had a Soviet-style civil defense. Do you remember saying that? Because the Los Angeles Times certified back to us that that is what you said, and they will verify it and prove it.

Mr. JONES. Well, sir, my recollection—

The CHAIRMAN. All I am saying is; if you did not say it, then flatly deny it, but they say you did. The most important thing is to set the record straight.

Mr. JONES. Sir, I have never analyzed that case and hence have no basis to believe it. My recollection is specifically that I did not make the statement.

The CHAIRMAN. Well, now the burden of proof is on the Los Angeles Times to come back with their documentation. Do you believe it now, then?

Mr. JONES. No, sir.

The CHAIRMAN. Well, then, that is all we need to know. Let us put it behind us, for heaven's sake. You know, I did not believe my eyes when I saw it, and not being able to question you here, as you know, I cabled everyone whom I could get ahold of quickly who was knowledgeable in this field, Ambassador Watson, who headed the General Advisory Committee on Arms Control, General Seignious, who was former Director of ACDA; Paul Warnke, also a former ACDA Director; Robert McNamara, Secretary of Defense; Harold Brown, Secretary of Defense; Gerard Smith, and I ask unanimous consent that all of their replies be incorporated in the record.

[The material referred to follows:]

To: CHP via Western Union (copy will be forthcoming).

Fm: T. J. Watson, Jr., Armonk, N.Y.

Re: Your telegram . . . the suggestion that there would be a high survival rate and quick recovery after a major U.S.-Soviet nuclear exchange is utter nonsense. Those who suggest this unrealistic result of nuclear war add to the present peril and to misunderstanding of the devastating results of the use of nuclear weapons. They are either uninformed or lack common sense or both.

T. J. WATSON, Jr.¹

REPLY BY GENERAL SEIGNIOUS² TO TELEGRAM³

If Mr. Jones said the statement quoted in your telegram, I consider it an outrageous transgression of logic and fact—one apparently intended to influence unknowing citizens. Shovels provide little protection against disease, fire, radiation, thrust blast and starvation. The back to the caveman idea is hardly good defense policy.

REMARKS OF PAUL WARNKE⁴

I read the reported remarks of Mr. T. K. Jones with disbelief and dismay. It's either a sick joke or an irresponsible effort to downplay the horror of nuclear war. His Civil Defense proposals would help solve only one problem—that of body disposal.

DR. McNAMARA'S⁵ STATEMENT IN RESPONSE TO CHP'S TELEGRAM

You have asked me whether the U.S. could recover from an all out nuclear attack in 2 to 4 years, if we had a "Soviet Style" civil defense. Such an attack could involve a strike by as many as 6 or 7 thousand war heads with an explosive yield of perhaps 10,000 megatons. I know of no form of civil defense which would permit the nation to "recover" from such an attack.

TELEPHONE CALL FROM ELAINE, HAROLD BROWN'S⁶ SECRETARY—MARCH 19, 1982

All-out civil defense could save some lives, even in an all-out nuclear war, but the United States and the Soviet Union would not survive an all-out strategic war as viable societies at any level of civil defense that has been contemplated for the United States, nor at any level that the Soviet Union has put into place.

MARCH 18, 1982.

To: CHP.

Through: BB.

From: Scott Ulin.

Re: Ambassador Smith's⁷ response to your question on civil defense.

Ambassador Smith called me with his response to your cable requesting his views on T. K. Jones' comment about the effectiveness of civil defense in a nuclear war. Ambassador Smith's response is:

"Buncumbe" (pronounced "bunkum"), (in other words, "bunk!")

The CHAIRMAN. Every one of them says that the statement is preposterous and unbelievable, and they would denounce it as an absolutely inaccurate representation of what would happen. So let us forget that now, and put it behind us.

¹ Tom Watson: former Ambassador to the U.S.S.R. and Chairman of the ACDA General Advisory Committee on Arms Control.

² General Seignious: former Director of ACDA.

³ Received by telecon from Ann. his secretary, March 19, 1982.

⁴ Paul Warnke: former Director of ACDA and Chief SALT Negotiator.

⁵ Robert McNamara: former Secretary of Defense.

⁶ Harold Brown: former Secretary of Defense.

⁷ Gerard Smith: former ACDA Head and Chief SALT Negotiator.

Mr. Perle, I do have a few questions for you which I will complete very quickly. If the United States were in a severe crisis with the Soviet Union, like the Cuban missile crisis, would not the chances of surviving such a crisis be better if neither side took destabilizing action and both sides in a sense remained calm? If suddenly the United States began to evacuate two-thirds of the American public from cities, would not really the Soviets read this to mean that the United States was really getting ready for nuclear war, or even getting ready to start one, and would not this be destabilizing?

Mr. PERLE. Clearly, sir, a decision to evacuate the major cities of the United States or the Soviet Union would gravely deepen the crisis. It would, indeed, be destabilizing.

The CHAIRMAN. In addition, if this happened, would there be a sense of general panic in the United States if such an evacuation plan were implemented, panic which might further prove destabilizing in a crisis?

Mr. PERLE. I should think that the massive evacuation of our major cities would be accompanied by dread, fear, and very likely panic. In all probability, we would only evacuate our cities if the Soviets had initiated evacuation of theirs. I doubt that we would ever be the first to evacuate.

The CHAIRMAN. It is a question of whether you have a shovel to cover yourself with 3 feet of dirt or jump into a bomb shelter. The question is the condition inside that shelter. We can hardly imagine what would happen if people were confined for long periods of time in shelters, and the condition in which they would come into these shelters.

Several prominent medical associations in recent months have devoted considerable attention to publicizing their view that virtually no medical response would be available in the event of a general nuclear exchange.

For example, the American Medical Association recently adopted a resolution stating that it was incumbent on the AMA to inform the President and the Congress of the medical consequences of nuclear war, and that no medical response is possible. Do you disagree with the conclusions of the AMA or agree with them?

Mr. PERLE. Senator, that question might be best directed to FEMA, but I do find it difficult to imagine that medical services would be abundant in the aftermath of a nuclear war. As to whether there would be none, that is a quantitative judgment which I am just not in a position to make.

The CHAIRMAN. If services would be either nonexistent or extraordinarily limited, then how do you reconcile your judgment with the proposed program which would appear as though we would be preparing somehow to survive?

Mr. PERLE. I believe, Senator Percy, that the administration's proposed program is a very modest one. I do not believe that it will lead to a false sense of security. On the other hand, one would imagine that the program would save lives in a nuclear disaster. This modest program should also enable us to cope better with civil disasters.

As I said in my statement, the program is little more than insurance against a remote contingency. There are, however, a variety of contingencies less than all-out nuclear war in which the capacity to bring some minimal level of civil defense to bear might save lives. We have responsibility for a minimum program.

The CHAIRMAN. Secretary Perle, envisioning the program described by Mr. Jones, approximately how many Americans would be prompt fatalities in an all-out nuclear exchange if the civil defense program buildup were not implemented, and what difference would it make if the civil defense program were fully implemented?

Mr. PERLE. Again, for a quantitative answer to that question, I would turn to the experts from the Federal Emergency Management Agency. Clearly, it makes a great deal of difference whether one is talking about a deliberate Soviet effort to destroy as many American civilians as possible or whether one is talking about an accident in which a single weapon has been launched without authorization. It depends enormously on the details of the size of the attack, but I cannot give you a quantitative answer. I would be glad to supply one for the record.

[The information referred to follows:]

DIFFERENCES IN PROMPT FATALITIES

Precise information on this matter is not available within the Department of Defense at this time, and, as noted earlier, must be obtained from the Federal Emergency Management Agency (FEMA). To expedite things, we have asked FEMA to provide a direct reply to the Committee.

The CHAIRMAN. My last question is a followup on Senator Pressler's question. Either my hearing is worse off than I thought it was or I did not hear a real answer from Mr. Jones on the question. Would each of you comment, including you, Mr. Jones? How do you think life would be in the United States a month, a year, 5 years after an all-out nuclear exchange?

Mr. PERLE. I cannot hope to portray very graphically how grim life would be, Senator. Let me say, however, that I know of no one in the administration responsible for these policies who thinks that even after 5 years we would not bear terrible scars from a catastrophe of unimaginable proportions. No one is under any illusion that the severity of nuclear war can be significantly diminished.

The CHAIRMAN. General Doyle, do you concur with that?

General DOYLE. Yes, sir.

The CHAIRMAN. Mr. Jones?

Mr. JONES. I share Mr. Perle's view on that, Senator. While the kind of protective measures the Soviets have certainly go a long way toward reducing the lethal effects of these things, they are still enormous effects and they do not go away easily. They are not to be casually regarded. Even with the Soviet program, which is 10 times greater than anything this administration is proposing in the United States, the damage would be extraordinary. While one could estimate recovery to gross national product levels, that does not in any way state the kind of damage that would still remain.

I do not know how their leaders might look at it, and so on, but I certainly know that, in my own personal judgment, deterrence is far more important than anything else.

The CHAIRMAN. Mr. Chairman, I want to thank you for holding this hearing in this subcommittee. I would like to state that I have yet to talk to a knowledgeable person in this field who can speak with any assurance of the fact that within the next 25 years we will not see some

horrible accident that has occurred in some way or other by a terrorist, by a mad chief of state, or by a mistake. I was in NORAD headquarters years ago when a false signal came, and I saw the panic that went through there, with people wondering, what do we do? I can assure you it was not the serene scene that was depicted in Reader's Digest by some public relations expert months later. That was totally misleading. I was there with Tom Watson, head of IBM at the time, and we thought it was chaos. How do we react? How do we deal with the situation?

I do not know anyone who does not think that in 25 years we may have the likelihood of something like this happening. Therefore, I consider this one issue the single most important issue that I will deal with in this Senate and that any Senator has to deal with.

This is a terribly important subcommittee, as I told Senator Pressler when he took the chairmanship of it, at either the subcommittee level or the full committee level. We will be consulting with you closely, as I told you when we originally talked with you, Secretary Perle. We will want to share views with you and express our ideals with you and to get your ideas and views, and follow very closely the thinking of the Department of Defense as well as the Department of State and the Arms Control Agency, as we have been consulting frequently with them in recent weeks.

Thank you very much.

Mr. PERLE. Thank you, Senator.

The CHAIRMAN. Thank you, Senator Pressler.

Senator PRESSLER. I have one followup question before I yield to Senator Tsongas.

Mr. Jones, there appears to be a contradiction between your statement that a nuclear war is not winnable and your estimate of the 2 to 4 years that it would take us to recover if we had a civil defense system like the Soviet's. The latter seems to imply that nuclear war would be winnable, would it not?

Mr. JONES. May I repeat my statement that the recovery time of the United States is something I have not estimated. The term "winning" implies value judgments. If you want my personal value judgment, I do not think the Soviets can win a nuclear war even with all of the protection they have. However, there is reason to believe that their value judgments are different than mine. I am concerned that the Soviet attitude and their collective military preparations give them a foundation for a view that they could fight and win a nuclear war.

If I may quote a few of the things that the Soviets are saying in their internal literature:

The premise of Marxism-Leninism on war as a continuation of policy by military means remains true in an atmosphere of fundamental change in military matters. The attempt of certain bourgeois ideologists to prove that nuclear war moves beyond the control of policy, ceases to be an instrument of policy, and does not constitute a continuation, is theoretically incorrect, and politically reactionary. The description of the correlation between war and policy is fully valid for the use of weapons of mass destruction.

That is their term for nuclear weapons.

Far from leading to a lessening of the role of policy in waging war, the tremendous might and means of destruction leads to the raising of that role. After

all, immeasurably more effective means of struggle are now at the direct disposal of state power.

This was from Communists of the Armed Forces, November 1975.

A marshal of the Soviet Union, in August of 1969, said:

Imperialist ideologists are trying to lull the vigilance of the world's people by having recourse to propaganda devices to the effect that there will be no victors in a future nuclear war.

He went on to say that in his words victory is achievable.

More recently, the marshal of the Soviet Union, Nicolai Ogarkov, writing in the Soviet Military Encyclopedia, 1979, said that:

Soviet military strategy proceeds with the view that should the Soviet Union be thrust into a nuclear war, then the Soviet people and their armed forces need to be prepared for the most severe and protracted trial. The Soviet Union and the Fraternal Socialist States will be in this case, in comparison to the imperialist states, in possession of definite advantages, the established just goals of the war, and the advanced nature of their social and state systems. This creates for them the objective possibility of achieving victory.

Ogarkov then goes on to point out that they must have timely and comprehensive preparation of the country and the armed forces to achieve that end.

Although I do not share that Soviet view, my concern is how we can realistically and rationally deter an adversary that does not share our views. Moreover, as I previously indicated, I do not accept that civil defenses, taken in isolation, would support that Soviet view. My concern is that Soviet military preparations support their view that a nuclear war can be won. The most telling indications are the preparations reload and refire their ICBM silos after an initial strike, and the vast preparations they have made not just to preserve their leadership and military communications, but to allow themselves to manage the country during an extended nuclear war. I am seriously concerned with Soviet preparations backed with statements that they can win a nuclear war. How do we deter them, given that, no matter how terrible the thought of such a war might be to the United States, they may accept it.

Senator TSONGAS [presiding]. Well, now that we have discovered communism as an ongoing society, that is perhaps where this is all coming from.

Mr. Jones, I for one happen to believe that you did say those things for the Los Angeles Times. If this committee is reduced to the level of saying that you did it on a personal basis and not as an official and that you did not say those things, then I would really worry.

Now I am going to start quoting you, and I want you to say whether indeed you still subscribe to these statements:

Today there is clear and increasing evidence that the Soviet Union is preparing to evacuate its citizens during the period of tension that would precede any nuclear war. They would disperse them over an area much larger than the U.S. nuclear arsenal could cover. They would construct simple fallout shelters to protect them from lethal radiation.

Such protection would enable 98 percent of the Soviet population to survive the U.S. retaliation against Soviet industrial targets. If the U.S. Arsenal were retargeted to attack the evacuated population, something like 96 to 97 percent of the Soviet citizens would still survive.

This is your testimony before the Committee on Armed Services in the House of Representatives, February 9, 1977, that 98 percent of the Soviet population would survive a U.S. retaliation.

Do you still subscribe to that view?

Mr. JONES. You covered several items in that statement, Senator. I will try to respond to all of them. As for the Soviet plans, this committee received a classified report from the intelligence community that supports an unclassified conclusion that the Soviets do have extensive plans and preparations for evacuating and sheltering their people.

Those plans are also documented in unclassified literature, and it has never been disputed in or out of the Government, that the Soviets have those plans.

Senator TSONGAS. Do you stick by the statement that 98 percent of the Soviet population would survive?

Mr. JONES. I will get to that, Senator, but I would like to go through, in order, the points that you made, if you don't mind.

The Soviet plans are backed by preparations including extensive building of hardened shelters within their cities. The pace of that shelter building is continuing. We have very good insight into the quality of those shelters. They protect their occupants quite well. They are not without flaws, but they provide a very high level of protection.

The main thrust, however, of the Soviet program is to protect the assets that are most important to them and, by the same token, that are most important to our ability to deter them: that is, their leadership, the command control and communications that their leadership would use to run the country, their military assets, and possibly the war supporting industry that supports those.

The latter aspect is the basis of my own concern re civil defense and its impact on the strength of our deterrent.

As for the estimates of Soviet survival, there are a number of analyses on those. I have sponsored at least two of them, the Arms Control and Disarmament Agency has run some, the Joint Chiefs of Staff have run some, and there has been an interagency group that included the Central Intelligence Agency that has run some.

The analyses that I have run were parametric analyses, which take account the full range of the variables that the Soviets might alter or adjust in order to enhance their population and industrial survival.

The resulting figures range from well over 100 million fatalities that the Soviet Union would expect if they had no civil defenses, to numbers as low as a couple of percent if they do everything per their plans.

The key point that I would like to emphasize is that there are wide variations between the U.S. estimates of the effectiveness of Soviet civil defenses. However, the factors that influence Soviet survival are more subject to control by the Soviet Union than they are by the United States.

If the Soviets wish to keep their survivability level very high, they can do that; if they get sloppy or careless about it or if they don't care, their survivability level will be correspondingly lower.

Senator TSONGAS. That is a fascinating answer, but you didn't say that to the committee. To the committee, you made the statement 98 percent of the Soviet population is going to survive.

Mr. JONES. There are conditions of Soviet protection under which that number would be true.

Senator TSONGAS. Will that be the most likely case? What is the most likely case. You say it takes a week of notice.

Mr. JONES. My estimate is it would take them at least a week. Science Applications, Inc. has made an estimate which comes out to about 8 or 9 days. The Central Intelligence Agency unclassified report on this subject points out that the times would range from 2 or 3 days for very poor protection where the fatalities would be very high, to a week or so where—

Senator TSONGAS. Well, let's go through the numbers. They have 1-day notice. How many would survive?

Mr. JONES. One-day notice of what, Senator? If the Soviet Union planned to attack the United States—

Senator TSONGAS. Of a thermonuclear exchange.

Mr. JONES. If the Soviet Union planned to attack the United States, Senator, they could control the clock. They would decide how much time they need and could run their timetable to provide the time needed to evacuate and shelter their people.

Senator TSONGAS. Well, let's say they decide. How much time do you think they will give themselves?

Mr. JONES. That I don't know.

Senator TSONGAS. Let's say it is a day.

Mr. JONES. In looking at it analytically, I believe that both my conclusions and the intelligence community conclusions would be that they should take at least a week.

Senator TSONGAS. So they would have a week in which they would cause their population to evacuate; is that correct?

Mr. JONES. They should take that long. It is generally believed that within that length of time they could get their urban residents well dispersed and they could prepare expedient shelters for those people.

Senator TSONGAS. How are they fed?

Mr. JONES. They are evacuated to the state and collective farms, according to Soviet planning. Much, if not most, of the food in the Soviet Union is stored in the state and collective farm areas. Soviet literature amply describes about how they protect their food supplies from nuclear effects and how to decontaminate that which is not protected.

Senator TSONGAS. Well, if you assume that they had to import food now when everything is going well and 98 percent of them are going to survive, where do they get the food for that 98 percent if they cannot feed the people that are there now?

Mr. JONES. I will have to speak from memory, and the numbers may not be exact, Senator, but their annual grain production runs around 180 million metric tons. Of that, the population consumes about 60 million, with another 30 million being required for seed for the next year's crop. So they plainly have enough to feed their people. A reduction in grain production would mean that their cattle that are consuming grain will eat grass instead of grain.

Senator TSONGAS. Do you think the United States would retarget its warheads if we saw them all of a sudden evacuating those cities?

Mr. JONES. I hope you are talking about a hypothetical example, Senator. Retargeting warheads to kill people?

Senator TSONGAS. Excuse me?

Mr. JONES. I hope that you are talking about a hypothetical example of retargeting warheads to kill people, because that is something that I understand we don't do, Mr. Perle may wish to speak to our policy on that.

Senator TSONGAS. Well, let me quote you:

In terms of killing people, none of our systems are very good. That includes the B-1 bomber, it includes the Trident, it includes the surviving Minuteman, the whole thing added up.

Mr. PERLE. There is another factor here, Senator Tsongas, which is that as a conscious matter of policy, we have not planned for the deliberate destruction of the civilian population.

Senator TSONGAS. So we would not retarget?

Mr. PERLE. That is correct. I would hope that you would agree that this is the least we can do in the interest of humanity.

Senator TSONGAS. That is not the least you can do in the interest of humanity, Mr. Perle.

Let me quote you again, Mr. Jones.

We conducted a series of tests which show that there are simple measures which we could put into place in a few days to protect industrial machinery within a couple of thousand feet from a one megaton explosion. Our conclusion was that if we protected our area using the Russian methods—

That is familiar, is it not?

We could recover from a nuclear war and start production within 4 to 12 weeks.

Applying that to the Soviet Union, we believe that they could recover their pre-war gross national product within 2 to 4 years, as compared to about 12 years in the case of the relatively unprotected situation in the United States.

You testified it would take 12 years for the United States to recover. I asked earlier about your estimate and you say we can't do it. Now, which of those statements is correct? You made a statement that using United States-Russian methods—

Mr. JONES. I think you have it backward, Senator.

Senator TSONGAS. Mr. Jones, the committee will stand in recess so that we can vote. I will be back shortly and I would like to pursue that issue with you.

[A brief recess was taken.]

Senator PRESSLER [presiding]. We will return to Senator Tsongas.

Senator TSONGAS. Mr. Chairman, I hope that is the last vote so we don't have to keep going through this.

Senator PRESSLER. So do I.

Senator TSONGAS. Mr. Chairman, I had asked about a quote that Mr. Jones had testified to before the House that he believed they could recover their prewar gross national product within 2 to 4 years as compared to the 12 years in the case of the relatively unprotected situation of the United States. So the estimate at that point was the United States could be put back together in 12 years. The question is whether that still applies today.

Mr. JONES. The estimate we made should have read 12 years or more, Senator.

Senator TSONGAS. It did not read 12 years or more.

Mr. JONES. It should have read that.

Senator TSONGAS. Mr. Chairman, here we have a situation with a witness who at various times has made statements that are clearly indefensible. We ask him to come before the committee. What happens? It is put off and put off and put off. He comes before the committee and says: I didn't say those things—we are going to check the Los Angeles Times and we will pursue that issue as well—or in this case, I should have said something else.

This report goes back 5 years. At no point during those 5 years did he ever suggest that that was wrong.

Mr. Jones, do you look at your testimony after you give it?

Mr. JONES. In that particular case it was not sent to me for review.

Senator TSONGAS. You have never seen this?

Mr. JONES. I have seen it in print. I did not get a chance to edit the transcript.

Senator TSONGAS. When you make a statement that the United States can recover in 12 years from a nuclear attack and you don't think that is correct, you feel no need to correct it?

Mr. JONES. The modeling that we did showed that it was 12 years or longer. As I indicated in earlier statements, Senator, the degree of damage to an unprotected United States would be so great that it exceeded the ability of the model to precisely estimate recovery—

Senator TSONGAS. But you didn't say that here. You didn't say anything about the models don't work. You said to the Congress: "We believe that they could recover their prewar gross national product within 2 to 4 years, as compared to 12 years in the case of the relatively unprotected situation of the United States."

There is no statement in here about our models don't apply to the situation. Where was it in your statement?

Mr. JONES. I did not say that they don't apply, Senator. You are taking some liberties with what I have said.

Senator TSONGAS. I am. I am quoting you.

Mr. JONES. When you say—

Senator TSONGAS. You say the Los Angeles Times violated the interview, that I am taking you out of context by quoting you. NBC Nightly News: "If the Russian people can survive, I see no reason why we can't do as well as they can." Now, if they can survive and bring back the GNP within 2 to 4 years, you believe that the United States can bring back its GNP to pre-war conditions in 2 to 4 years as well. Is that right?

Mr. JONES. It would not be credible to extrapolate a GNP recovery projection from the statement that we could survive as well as they do.

Senator TSONGAS. What does that mean, "If the Russian people can survive, then I see no reason why we can't do as well as they can?"

Mr. JONES. You are trying to construct a statement that I can't support and that I wouldn't believe. The inference is that you don't believe it either, so it seems to me that we agree.

Senator TSONGAS. If what you said before the committees we cannot rely upon, the Los Angeles Times obviously is a paper without credibility, and the "NBC Nightly News" clearly made a serious mistake in quoting you, where are we? Anything that you say as outrageous was taken out of context. I am only using your words, Mr. Jones. I am only using your words.

Mr. JONES. The committee transcript is not out of context. On the other hand, one cannot expect to take specific results very detailed technical analysis, and equate them to a general statement made 2 or 3 years later.

Senator TSONGAS. Tell me where the technical details are in this statement: "If the Russian people can survive, then I see no reason why we can't do as well as they can." What is technical about that? You were on "NBC Nightly News."

Mr. JONES. I agree with that statement.

Senator TSONGAS. Oh, so you agree with it.

Mr. JONES. Certainly I agree with that statement. That is a technically supportable fact—

Senator TSONGAS. That we can do as well as the Russians?

Mr. JONES. In terms of population survival, there is no technical reason why we couldn't. It would be somewhat more difficult for us than it is for them, Senator, because, as I am sure you know, the Soviets have a much larger nuclear arsenal than we do.

Senator TSONGAS. So if we can do as well as they can, that means that we can achieve 98 percent survival of our population.

Mr. JONES. Equating a precise number with a general statement would be taking great liberty with what I said.

Senator TSONGAS. But that is the position you took in the committee when you testified. You said, "Such protection would enable 98 percent of the Soviet population to survive the U.S. retaliation against Soviet industrial targets." Your intent at that meeting with the committee was to leave them the impression clearly stated that 98 percent of the population in Russia would survive given their strategies.

You then said to NBC that if the Russian people can survive, then I see no reason why we can't as well as they can. You just said that we can protect our people as well as they can protect theirs. If theirs is at 98 percent, then clearly ours must be at 98 percent as well. So you are postulating that 98 percent of the American people could survive an all-out nuclear attack by the Soviet Union were the appropriate protective measures taken. Is that correct?

Mr. JONES. Senator, what you are trying to do is to take one statement made in one place at one time and connect it with a different statement made at a different place at a different time. That is not a technically valid way to try to assemble the statements.

Senator TSONGAS. Well then, let's go through them. You said before the committee 98 percent Soviet survival; do you agree?

Mr. JONES. That is correct.

Senator TSONGAS. You said to "NBC Nightly News": I see no reason why we cannot do as well as they can. Is that correct?

Mr. JONES. It would be technically incorrect, Senator, to link those statements as you are trying to do. I would suggest that anyone on your staff who has the technical qualifications to understand these matters could advise you on this. Certainly to make that connection—

Senator TSONGAS. Well, you tell me which word in these sentences I would need some technical advice on: "If the Russian people can survive, then I see no reason why we can't do as well as they can." On which part of that do I need technical advice?

Mr. JONES. You are trying to connect a general statement with a specific technical analysis to say one equals the other or that the Soviet 98 percent figure applies to the United States. That is not valid, Senator. In particular, it is not valid because in the 5 years since the first statement was made, the Soviet arsenal has changed dramatically. I am sure you are aware of that.

While one might have been able to make a statement like that 4 or 5 years ago, being able to make it today is quite a different matter.

Senator TSONGAS. Well, what you said to NBC was March 4.

Mr. JONES. That is right. But what you are trying to do with the March 4 statement in this year is to link it with the 98-percent figure that is several years old.

Senator TSONGAS. Well, let me see. The Soviets could achieve 98-percent survival. They have gone through this massive civil defense program. Now you are saying that they had less survival than they did 5 years ago?

Mr. JONES. What you are trying to do, Senator, is simply not technically supportable. I don't know what you want to believe.

Senator TSONGAS. I just want you to answer my question.

Mr. JONES. It is not a technically supportable argument. I certainly cannot condone it or accept it. I have estimated the effectiveness of Soviet civil defense preparations, using parametric analysis, and 98 percent is a figure that matches one set of conditions in the full range that was examined. But I also said—

Senator TSONGAS. OK, 98 percent. Has the Soviet civil defense protection increased or decreased since you made that statement?

Mr. JONES. That is not the issue here.

Senator TSONGAS. Answer my question. Has it increased or decreased?

Mr. JONES. It has continued to increase.

Senator TSONGAS. So their protection has increased, 5 years ago it was 98 percent. If it has increased, to what extent has it increased under the same scenario you postulated in 1977?

Mr. JONES. I can't answer that because I have not updated the analysis to account for the effects of the increased defenses.

Senator TSONGAS. But you are going around the country saying the Soviets have built this incredible civil defense structure.

Mr. JONES. That is a correct statement.

Senator TSONGAS. OK. If they could protect 98 percent of their population 5 years ago and since then they have engaged in this massive civil defense structure, one would have to assume that they could protect more than 98 percent today.

Mr. JONES. One might infer that, but how much more, I don't know.

Senator TSONGAS. So it is about 98 percent now?

Mr. JONES. It should be somewhat better than it was, but how much can only be determined by reiterating the analysis.

Senator TSONGAS. OK. Very good. So you have just made the statement that they are better now than they were 5 years ago; correct?

Mr. JONES. By some amount.

Senator TSONGAS. Excuse me?

Mr. JONES. By some amount, some unknown amount.

Senator TSONGAS. And if they were 98 percent 5 years ago, they would have to be at 98 percent plus today.

Mr. JONES. Yes.

Senator TSONGAS. That is second grade mathematics, right?

Mr. JONES. Yes.

Senator TSONGAS. Now, this month you said if the Russian people can survive, then I see no reason why we can't do as well as they can. Since they can achieve survivability of 98 percent plus, according to what you said this month, we can do the same.

Mr. JONES. Senator, if you want to estimate on what we can do, you should ask FEMA.

Senator TSONGAS. FEMA was not the subject of the NBC Nightly News program. You were. Why didn't you tell NBC: don't talk to me, talk to FEMA?

Mr. JONES. When it comes down to precise estimates of the type that you are trying to infer, I do exactly that. I ask FEMA or I refer questions to FEMA. You are trying to connect a general statement not intended to be precise with a quantitative statement made under other circumstances under other analyses at a different period of time and relating to a different Soviet arsenal.

Senator TSONGAS. OK, then, let's agree that it was not intended to be precise. What did you mean? Let me just ask you in your terms, what did you mean when you said if the Russian people can survive, then I see no reason why we can't do as well as they can?

Mr. JONES. That the laws of physics apply equally to both sides. If the Soviets can build shelters and they work, the shelters that they build could work as well for us as they would for them. It is the same physics book.

Senator TSONGAS. So we can do as well as they can.

Mr. JONES. I know of no reason why we can't. You may think that your constituency is less capable than the Russians, but I don't see any reason to believe that.

Senator TSONGAS. OK. If we can do as well as they can and they can achieve 98-percent survival, then by definition we can achieve 98-percent survival.

Mr. JONES. I would not make that statement. If you want a number from somebody, I would suggest you get one from FEMA.

Senator TSONGAS. Well, tell me, if the laws of physics remain the same in both countries and you say we can do as well as they can and they can achieve 98-percent survival, given that, that we can do as well as we can, if we did everything you wanted, what percent survival?

Mr. JONES. Senator, if you want numbers from me, there is a process that I get them from, and that is known as analysis and estimating.

Senator TSONGAS. Have you done that?

Mr. JONES. I can't give you numbers that I haven't run through an estimating process. I am just not going to do that.

Senator TSONGAS. But if you haven't done the analysis, how can you make the statement that we could do as well as they can?

Mr. JONES. A general statement can always be made. However, one cannot correctly relate a general statement to a specific number. I have pointed out to you repeatedly that to do so is not technically valid. With all due respect, sir, it is just not supportable.

Senator TSONGAS. Mr. Chairman, it is obvious that we are not going to get the answers to the questions, and I suppose in most cases it

doesn't matter. You can send someone up in basically a damage control scenario. Mr. Jones is going to go back and they are going to say, "Well, how did you do?" and he will say, "Well, I told them I didn't say it, I told them it was not a technically correct analysis and that whatever I did say, I said on a personal level and not as a representative of the Government."

That person is going to say, "Did they believe it?" He is going to say, "Yep, they took it hook, line, and sinker."

Senator PRESSLER. May I say that I agree with my colleague very much. It seems to me a very strange scenario that someone who is Deputy Under Secretary of Defense, speaking in that capacity around the country and writing articles, that we are to assume or not to know whether it is a private statement or a public statement, that we have to hold a hearing to find out. This is a very strange way to operate. I don't accept it but I don't know what more we can do.

Well, I can only say to the Defense Department about Mr. Perle's statement that he speaks in terms of policy, that if he has somebody out speaking or writing Op-Ed pieces under the title of Deputy Under Secretary of Defense for Strategic and Theater Nuclear Forces, the man on the street certainly thinks he is speaking for the Defense Department, and I would think a Senator could reasonably think that.

Senator Cranston has some questions. Perhaps if he will not return we can submit those for the record, but I think they have probably been asked.

Senator TSONGAS. Well, I am not finished, Mr. Chairman.

Mr. Jones, you say you have never done the analysis on U.S. survival and what would happen to the United States after a Soviet attack.

Mr. JONES. I have run some parametric analyses on U.S. survival levels, but they were not precise because of the major damage an unprotected United States would suffer.

Senator TSONGAS. I didn't hear you.

Mr. JONES. They were not as accurate as the analyses we did on the Soviet side.

Senator TSONGAS. So you have done analysis?

Mr. JONES. Yes.

Senator TSONGAS. And it was after you did that analysis that you came up with the 12-year figure?

Mr. JONES. The 12 years or more was part of an econometric simulation rather than something that focused only on population survival.

Senator TSONGAS. Mr. Jones, I don't have it in front of me, but you have used the term "12 years" more than once, so even if you can assume that it was an error in that one case—let me show you what staff point out. Here is another one.

If the observed examples of Soviet industrial dispersal and separation of their industrial buildings represent the pattern for Russia's future capital expansion, Soviet industry would require little or no pre-attack hardening in order to survive and recover quickly. By quickly, I mean 2 to 4 years, compared with about 12 years for the United States.

Now, did you make the same mistake there?

Mr. JONES. The statement was taken from the same analysis discussed earlier.

Senator TSONGAS. That was in 1977. Five years later—did you see the statement?

Mr. JONES. Yes, I have it in front of me.

Senator TSONGAS. Excuse me?

Mr. JONES. I have it in front of me.

Senator TSONGAS. Have you ever clarified that?

Mr. JONES. There is a word in there that you read to me, Senator, and I call your attention to it. It is the word "if." Is that in the transcript in front of you?

Senator TSONGAS. "Further, if the observed samples of Soviet industrial dispersal." You were referring to them, if they did all of that, right, consistent with what you said before. "By quickly, I mean 2 to 4 years, compared with about 12 years for the United States."

Mr. JONES. And that is the word "if," right? You do agree that the word "if" is in there.

Senator TSONGAS. All right. So how does the "if" modify the 12 years?

Mr. JONES. Oh, it doesn't modify the 12 years. It is about 12. It is actually somewhat longer than 12.

Senator TSONGAS. OK. So the United States could recover its GNP to prewar conditions in 12 years, about.

Mr. JONES. About.

Senator TSONGAS. Finally.

Mr. JONES. We do not have high technical confidence in that particular number.

Senator TSONGAS. Mr. Chairman, let me say that we have been here for 3 hours to get a straight answer, and the quotes that have been read back—I didn't say it. I said it in a personal capacity or I was misquoted. Finally we have a straight answer.

I think it should be made very clear and it should not be forgotten: Mr. Jones' testimony just indicated the United States would recover its prewar GNP in about 12 years after a thermonuclear exchange with the Soviet Union. Right?

Mr. JONES. It is approximate, yes.

Senator TSONGAS. Well, Mr. Chairman, I am glad we didn't give up, because I would be intrigued if the committee were to bring people in—given the current economic policies, we may not get to current GNP in 12 years without a war. [General laughter.]

I think finally, as far as I am concerned, we have a statement that is definitive which suggests where this witness is coming from. This witness is part of the administration. You are going to have the President on tonight talking about arms control, and the people who are in charge of these issues say we are going to recover in 12 years. That is a fascinating kind of disassociation.

I very much appreciate, Mr. Chairman, your bearing with me in what was a very frustrating afternoon but finally brought to fruition. I thank the Chair.

Senator PRESSLER. We will leave the record open for additional questions.

I want to thank the witnesses for coming.

There are additional questions from Senator Cranston and Senator Percy and me on some of the technical aspects.

In addition, I will insert in the record of the hearing at this point an assessment of the Soviet civil defense program that was prepared by Dr. Leon Gouré, Director of the Center for Soviet Studies at Science Applications, Inc.

[The material referred to follows:]

SOVIET VIEWS ON AND SOME CHARACTERISTICS OF U.S.S.R. CIVIL DEFENSE, PREPARED BY DR. LEON GOURÉ, DIRECTOR, CENTER FOR SOVIET STUDIES, SCIENCE APPLICATIONS, INC., MCLEAN, VA.

I am very grateful to the Committee for allowing me to submit for the record the following personal observations on Soviet civil defense. My remarks are based on studies and analyses of the Soviet Civil Defense Program which I have conducted over a period of some 27 years, utilizing a variety of Soviet source materials, as well as personal observations in the U.S.S.R. and interviews with knowledgeable former citizens of that country.

Americans often find it difficult to accept the possibility that the Soviet political and military leadership may seriously hold views on defense, strategy, nuclear war and the possibility of war survival which significantly differ from their own. For example, it has taken many years for U.S. decisionmakers to explicitly accept and react to the fact, as former Secretary of Defense Dr. Harold Brown has done, that Soviet strategic doctrine and views on the conduct and possible outcome of a nuclear war are significantly different from those held in the United States. Even more so, Americans find it difficult to accept that the Soviets can seriously believe that the Soviet Union may be able to survive such a war and that they attach great importance to civil defense as a key element of their defense capability and war survival strategy. Indeed, for many years there was widespread disbelief that the Soviet Union was actually implementing a large civil defense program.

Even today, as is evident from the present public debate on civil defense, it is apparent that a great deal of misconceptions and misinformation persist about Soviet civil defense. These misconceptions and misinformation persist about standing of Soviet values and priorities. They are also the result of a tendency to judge the Soviet civil defense program in terms of what individuals imagine a realistic and effective civil defense capability ought to be like, or in terms of war scenarios which are at variance with Soviet assumptions. This has given rise to the erroneous view that the actual purpose of Soviet civil defense is propagandistic rather than reflecting a serious interest in war survival. It is often asserted that Soviet civil defense is meant to demonstrate to the Soviet people the leadership's concern for its safety and to strengthen public morale and support for Soviet policies. Unfortunately, while the program may have such an effect, the levels of effort and investments of relatively scarce resources in it are far too great to be explained in any other terms than as a serious Soviet commitment to the attainment of a large, comprehensive and effective civil defense capability.

SOVIET VIEWS ON THE STRATEGIC SIGNIFICANCE OF CIVIL DEFENSE

The Soviet post-World War II civil defense program was initiated at the beginning of the 1950's. It was not until 1961, however, that a comprehensive nationwide program was instituted, when it was placed under military control in the U.S.S.R. Ministry of Defense. The program has been publicly endorsed by Soviet political and military leaders, including repeatedly by Brezhnev himself. It is important to note that over the years the leadership interest in and the efforts devoted to civil defense, far from declining, have in fact notably increased. This has especially been the case since 1972 following the signing of SALT I.

Soviet interest in civil defense has been justified at times entirely on humanitarian grounds. For example, Brezhnev has done so in May 1978, arguing that the Soviet Union's war experience and the persistent threat of war necessitate continuing efforts to protect the Soviet people and the country from the consequences of modern warfare.¹ Brezhnev and other Soviet spokesmen also assert that Soviet civil defense does not alter the strategic balance and does not increase the willingness of the Soviet Union to initiate war. Even so, Soviet military

¹ L. I. Brezhnev, answers to questions by Vorwaerts (FRG), TASS, Moscow, May 2, 1978.

leaders have and continue to assert that Soviet civil defense is an essential and integral part of the Soviet Union's defense capability—that is a “factor of strategic significance” and that its continuing improvement, as *Red Star* of January 19, 1982, reaffirms, “actively contributes to the further strengthening of the motherland's defense capability.”²

In Soviet views, the reason why civil defense is strategically significant and important for a rational and credible defense posture is that, in the nuclear age, “the fate of states will be decided not only on the battlefields, but also in the depth of their territories.”³ Furthermore, it is noted that without “the survival of the state . . . even successful combat actions may lose their importance,”⁴ and become merely acts of revenge without prospects for attaining any meaningful war outcome. The Soviets reject the concept of Mutual Assured Destruction as a basis for Soviet strategy or security. Consequently, it is asserted that “the protection of the homeland . . . is becoming one of the most important tasks in a war.”⁵ Indeed, war survival of the Soviet Union is a fundamental objective of Soviet military doctrine and strategy, and it is believed that civil defense can make a critical contribution to this objective, as well as to the ability of the Soviet Union to effectively wage war, especially a possible protracted one.⁶ This may explain why the Soviets refused to discuss civil defense in SALT II, as the United States had proposed.

As the Soviets see it, a war survival capability coupled with a highly effective warfighting posture lend essential credibility and effectiveness to Soviet strategic deterrence as well as enhance the potential political utility of Soviet military might. It has been specifically claimed that:

“Improvement of Soviet civil defense and an increase in its effectiveness constitutes one more major obstacle in the way of the unleashing of a new world war by the imperialists. Consequently, Soviet civil defense intensifies that peaceful action taken by our state and strengthens international security as a whole.”⁷

Or again, it is argued that “the readiness of our Soviet economy for a possible imperialist war,” which is largely a function of civil defense measures to ensure the survival and wartime functioning of essential elements of the economy, “represents an important factor for restraining the expansionist aspirations of the imperialist aggressors.”⁸ Furthermore, given the repeated Soviet assertions that civil defense can have a significant influence on the conduct of a nuclear war and enhance prospects for its favorable outcome and postwar recovery, the Soviets believe that their civil defense program also lends greater credibility to the U.S.S.R.'s strategic deterrent.

² For example, see Politburo member and U.S.S.R. Minister of Defense, Marshal of the Soviet Union A. Grechko, *Vooruzhennyye Sily Sovetskogo Gosudarstva* (The Armed Forces of the Soviet State), 2nd edition, (Moscow: Voenizdat, 1979), p. 115; Chief of the Warsaw Pact forces and U.S.S.R. First Deputy Minister of Defense, Marshal of the Soviet Union V. G. Kulikov, “A Great National Cause,” *Voennoye Znanie* (Military Knowledge), No. 3, May 1974, p. 3; Editorial, “The Combat Training of Soviet Civil Defense Scouts,” *Krasnaya Zvezda* (Red Star), May 17, 1973; Colonel V. Ryabchikov, “Civil Defense of the U.S.S.R.,” *Soviet Military Review*, No. 2, February 1977, pp. 46-47; V. G. Strenko, *Otkoronnaya Rabota Mestnykh Sovetov* (Defense Work of Local Soviets), (Moscow: Yuridicheskaya Literatura, 1981), p. 48; Major General D. A. Volkogonov, A. S. Milovidov and S. A. Tyashchevich, editors, *Voyna i Armiya* (War and the Army), (Moscow: Voenizdat, 1977), pp. 155-156; editorial, “Civil Defense,” *Red Star*, Jan. 19, 1982.

³ U.S.S.R. Deputy Minister of Defense, General of the Army A. Altunin, “Humanitarian Aims, Responsible Tasks,” *Agitator Armii i Flota* (Agitator of the Army and Navy), No. 3, February 1980, p. 8; Colonel General A. S. Zheltov, editor, V. I. Lenin i Sovetskoye Vooruzhennyye Sily (V. I. Lenin and the Soviet Armed Forces), (Moscow: Voenizdat, 1980), p. 488.

⁴ Lieutenant General M. Gareyev, “Military Science as an Important Factor of Defense Potential,” *Soviet Military Review*, No. 12, December 1976, p. 16.

⁵ Altunin, op. cit.; see also Grechko, op. cit., pp. 114-115.

⁶ Chief of the General Staff and U.S.S.R. First Deputy Minister of Defense, Marshal of the Soviet Union N. Ogarkov, “Strategy,” *Sovetskaya Voennoye Entsiklopediya* (Soviet Military Encyclopedia), Vol. 7, (Moscow: Voenizdat, 1977), p. 564, also in “Guarding Peaceful Labor,” *Kommunist*, No. 10, July 1981, p. 87, and in *Vsegda v Gotovnosti k Zashchite Otechestva* (Always Ready to Defend the Fatherland), (Moscow: Voenizdat, 1982), pp. 60-61; General of the Army E. E. Mal'tsev, editor, *KPSS—Organizator Zashchity Sovetskogo Otechestva* (CPSU—Organizer of the Defense of the Socialist Fatherland), (Moscow: Voenizdat, 1977), p. 331; General of the Army A. Altunin, editor, *Grozhdanskaya Obrona* (Civil Defense), (Moscow: Voenizdat, 1980), p. 12; Major General A. S. Milovidov, editor, “The Philosophical Heritage of V. I. Lenin and the Problems of Contemporary War” (Moscow: Voenizdat, 1972), translated under the auspices of the U.S. Air Force Soviet Military Thought Series No. 5, (Washington, D.C.: U.S. Government Printing Office), p. 240.

⁷ Milovidov, op. cit., p. 251.

⁸ Major General M. Cherednichenko, “Modern War and Economics,” *Kommunist Vooruzhennykh Sil* (Communist of the Armed Forces), No. 18, September 1971, p. 25.

The question arises, therefore, how the Soviet leadership assesses the credibility and utility of U.S. strategic deterrence in the absence of any significant U.S. civil defense capability. There is no doubt that the area of civil defense constitutes the most notable asymmetry in the U.S.-Soviet strategic balance. It is also obvious that in the final analysis, the credibility of deterrence is in the eye of the beholder and, consequently, as Secretary Brown has properly noted, "what counts is what Soviet civilian and military leaders believe."⁹ It is equally clear that Soviet assessments of the credibility of U.S. deterrence do not depend only on existing U.S. strategic capabilities, but also on Soviet perceptions of U.S. willingness to use force in response to Soviet provocations and of the rationality of such an action.

The Soviets very much doubt that the United States would deliberately choose a course of action which in its own expectations may result in the U.S. suffering catastrophic human losses and damage and put in doubt its continuing national existence. In this connection, the Soviets are well aware and cite various U.S. estimates to the effect that a nuclear war may cause some 140 million or more American fatalities. No doubt they are also well aware that U.S. estimates put possible Soviet losses following the implementation of civil defense measures at a very much lower figure (from less than 20 million to some 34 million).¹⁰ Given this U.S. vulnerability, the Soviets see a certain logic in what they claim to perceive as growing U.S. reliance on a first or preemptive counterforce strike whose objective would be to greatly weaken Soviet retaliatory strikes and thereby save the United States from destruction.¹¹ Since U.S. survival presumably depends on the success of its counterforce strike, the United States—of necessity—would have to be quick on the nuclear trigger. In a similar vein, Soviet spokesmen claim that in order to ensure its own survival, the United States has developed a "limited" nuclear war doctrine and is also attempting to confine any possible future war to regions well away from the American continent.¹²

The Soviets are also aware that the continuing U.S. total vulnerability to a nuclear attack leaves it open to possible coercion in crisis situations. The Soviets persistently play up the danger that any level of U.S.-Soviet military confrontation initiated by the United States is likely to escalate into an all-out nuclear war which would result in catastrophic losses to the United States. Suggestive of possibly Soviet nuclear blackmail in a crisis situation were a series of Soviet articles and radio broadcasts in English to the United States in 1980 in connection with the announced U.S. intention to ensure the survival of its national command authority and continuity of government in the event of war. *Pravda* commented that, "The bosses who cooked up the atomic mess go off to shelters while everyone else [in the United States] can go to hell."¹³ Similarly, the radio broadcasts asked "But what about those 140 million Americans who, according to competent experts, will die in the very first day of a nuclear war?"¹⁴

Thus, given that the Soviets believe civil defense to be a necessary element of a rational and credible defense posture and their views on present U.S. vulnerabilities, there are persuasive reasons to think that a U.S. civil defense program would significantly contribute to the enhancement of the credibility of U.S. strategic deterrence in Soviet perceptions, as well as to a reduction of the vulnerability of the United States to Soviet coercion in crisis situations.

SOME CHARACTERISTICS OF SOVIET CIVIL DEFENSE

In order to properly assess the Soviet Civil Defense program, it is necessary to take account of Soviet values and priorities as well as views on likely war-fighting scenarios. Otherwise one can easily come to believe that Soviet civil defense is less significant than is actually the case.

⁹ Secretary of Defense Harold Brown, Department of Defense Annual Report for FY 1979, (Washington, D.C.: Department of Defense, Feb. 2, 1978), p. 5.

¹⁰ For example, see Secretary of Defense Harold Brown, Department of Defense Annual Report for FY 1982 (Washington, D.C.: Department of Defense, Jan. 19, 1981), p. 37.

¹¹ For example, see "Whence the Threat to Peace" (Moscow: Military Publishing House, 1982), p. 58; Major General R. Simonyan, "Trends in the Development of U.S. Military Doctrine," *Zarubezhnoye Voennoye Obozreniye* (Foreign Military Review), No. 11, November 1981, pp. 8-9; Colonel L. Seveyko, "Washington's Nuclear Tightrope Walking," *Red Star*, Oct. 30, 1981; T. Kolesnichenko, "Military Fever," *Pravda*, Oct. 24, 1981; Colonel M. Ponomarev, "On a Dancero's Path," *Red Star*, Mar. 15, 1981; Lieutenant General N. Chernov, interview in *Rudi Pravo* (Prague), Nov. 5, 1981; A. Evin, "Attempts Using Unsuitable Means," *Izvestiya*, Sept. 24, 1981.

¹² For a discussion of Soviet views on U.S. vulnerabilities and the credibility of U.S. strategic doctrine, see L. Gouré, "The U.S. Countervailing Strategy in Soviet Perceptions," *Strategic Review*, Fall 1981, pp. 51-64.

¹³ S. Vishnevskiy, "Evacuation Games," *Pravda*, Sept. 19, 1980. See also V. Baikov, "First Strike—A Suicidal Strategy," *New Times*, No. 43, October 1980, p. 20.

¹⁴ For example, see Radio Moscow, TASS commentary by V. Goncharov, Aug. 12, 1980, and Radio Moscow, TASS in English, Aug. 16, 1980.

Soviet values and priorities are especially clearly reflected in the peacetime blast shelter construction program. In this connection, it is important to recognize that while having some concern for the absolute number of possible Soviet population losses in a nuclear war, the Soviet leadership is far more sensitive to the question of who may be killed. Consequently, priority in peacetime shelter construction in urban areas is based on two criteria. The first is the value placed on particular individuals, organizations and select elements of the population in terms of their contribution to system survival, the sustaining of and effective war effort and postwar recovery, and the maintenance of the Soviet Union's power position. The second is based on a Soviet assessment of the likelihood that a particular locality or installation would be attacked in accordance with Soviet judgments about the significance of a given target. Consequently, priority is given to providing ready shelters for leadership, management and elite elements, scientific personnel, essential workers, school children and students, civil defense staffs at all levels, etc., with shelters for the general population being assigned a lower order of priority. It also follows that existing capabilities to shelter the urban population vary according to the priorities assigned to localities for this purpose.

Although a 1978 U.S. intelligence estimate of existing blast shelters suggested that there exists sufficient space for some 10 to 20 percent of the urban population,¹⁵ there are sufficient shelters for a high percentage of what the Soviets identify as constituting the "valuable" element of their population. Thus, from the viewpoint of the leaders, civil defense is meeting this important requirement. It must also be noted that the above estimate did not include dual-purpose shelters such as subways, underground garages, tunnels and underground pedestrian walkways, etc., which are designated as shelters in the Soviet Union and presumably adapted for this purpose. Finally, since the early 1970's, the publicly-stated Soviet objective is to develop the capability to "shelter the entire population in protective structures," and there is ample evidence that the Soviets continue to build shelters.¹⁶

Even so, it is obvious that pre-attack evacuation of the population from what the Soviets consider to be high risk areas remains a major Soviet civil defense requirement. There is also the additional requirement in Soviet civil defense plans for the pre-attack evacuation from urban areas of the great mass of civil defense personnel and equipment. The purpose of this evacuation of organized civil defense formations to areas outside the cities is to have the capability to conduct large-scale post-strike rescue, damage-limiting, repair and restoration operations in the areas of nuclear damage. Included in this evacuation will be the resting shifts of essential workers, all medical, public service and public works organizations, utility repair organizations and so on—in all, close to 20 million persons.

It is important to note that Soviet civil defense publications specifically recognize that without pre-attack evacuation of high risk areas and of urban civil defense formations, losses among the population could be very large and, possibly of greater concern to the Soviets, post-strike rescue of essential workers and damage-limitation and repair at essential enterprises and installations may be impossible. Soviet civil defense, therefore, has developed detailed, coordinated plans for rapid evacuation of the urban population and has implemented a certain amount of measures in rural areas to prepare them to receive, house, feed and shelter urban evacuees. The continuing importance of pre-attack evacuation in Soviet civil defense plans also has significant implications for a U.S. civil defense program.

Although Soviet propagandistic pronouncements, especially those addressed to foreign audiences, project a cataclysmic picture of the consequences of a nuclear war, Soviet civil defense concepts and plans suggest a somewhat less extreme war scenario. For example, this scenario downgrades the likelihood of a surprise attack on cities and appears to exclude the targeting of the cities and population per se. In the Soviet view, such attacks would be a waste of relatively scarce and very costly nuclear assets. According to the scenario, the belligerents would primarily seek to destroy their opponent's ability to wage war. The targeting of

¹⁵ For example, see Director of Central Intelligence, Soviet Civil Defense, SI 78-10003, July 1978, p. 9.

¹⁶ Colonel General A. Altunin, *Sovetskii Patriot* (Soviet Patriot), Nov. 21, 1973 and "Civil Defense Today" in *Lyudi i Dela Grazhdanskoy Oborony* (People and Affairs of Civil Defense), (Moscow: Voenizdat, 1974), p. 9; K. G. Fotlukov, K. S. Orlotin and A. I. Skilevskiy, *Grazhdanskaya Oborona Vchera i Segodny* (Civil Defense Yesterday and Today), (Moscow: Atomizdat, 1975), p. 90.

economic installations would be with the latter objective in mind and, therefore, would be selective and possibly relatively limited. The Soviets also appear to believe the occurrence of conditions which would permit the rapid post-strike execution of rescue, damage-limiting and repair operations in areas of nuclear damage to be sufficiently likely to justify the creation of a many-million force and a multi-billion dollar investment for this purpose.

In this connection, it should be noted that the frequently-cited figure of \$2 billion as representing the annual Soviet investment in civil defense is misleading. This cost estimate is taken from the 1978 report by the Director of Central Intelligence (DCI) on Soviet Civil Defense,¹⁷ and represents the equivalent U.S. cost of only three elements of the Soviet civil defense program: full time civil defense personnel, operation of military civil defense units and blast shelter construction. This estimate, however, does not include other costs of the program: the equipping of more than 20 million part-time civil defense personnel, training of this personnel and of the general population, adapting dual-purpose installations for use as shelters, protective measures for industry and transportation, mass production of gas masks and protective suits, stockpiling of civil defense equipment and supplies, construction materials, repair materials and spare parts, food, fuel, raw materials and so on. The total Soviet annual investment in civil defense remains difficult to assess. British, Swiss and Swedish estimates which suggest that it may be on the order of \$6 billion per year in equivalent U.S. costs appear to be reasonable.

Since Soviet leaders are unlikely to invest such a large amount of relatively scarce resources year after year in a program unless they are really convinced of its utility, one must agree with the DCI report's conclusion that: "The Soviets almost certainly believe that present civil defense will improve their ability to conduct military operations and will enhance the U.S.S.R.'s chances for survival following a nuclear exchange."¹⁸

Given Soviet views on the strategic significance and utility of civil defense, large Soviet investments in a civil defense program and the urgent necessity for states to have the ability to mitigate the devastating consequences of possible nuclear attacks, the development of a civil defense capability is very much in the United States's interest.

Senator PRESSLER. I do thank the witnesses for a long afternoon, and I adjourn this meeting.

[Whereupon, at 5:15 p.m., the subcommittee adjourned, subject to call of the Chair.]

¹⁷ Director of Central Intelligence, *op. cit.*, p. 11.

¹⁸ *Ibid.*, p. 12.

APPENDIX

PREPARED STATEMENT OF JENNIFER LEANING, M.D., MEMBER, NATIONAL EXECUTIVE
COMMITTEE, PHYSICIANS FOR SOCIAL RESPONSIBILITY, INC.

CIVIL DEFENSE IN THE NUCLEAR AGE: STRATEGIC, MEDICAL, AND DEMOGRAPHIC ASPECTS

Introduction

It is now becoming a matter of necessity to understand the evolution of civil defense in the last few years and its proposed function in the setting of nuclear attack and nuclear war. The civilian use of civil defense is familiar to most of us, as a series of programs designed to protect the continental U.S. non-combatant population from floods, tornados, hurricanes, earthquakes and forest fires. National disasters, often occurring without warning, have affected some of us; and we all recognize that civil defense efforts during these disasters have been important in reducing casualties and protecting property.

For a few brief years in the 1950's, during the height of the cold war, civil defense programs were introduced in a military setting as the United States became concerned about Soviet nuclear capabilities and sought measures to protect the U.S. population from nuclear attack. The efficacy of air raid drills and home bomb shelters came into question, however, as U.S. military strategists learned more about the thermal, blast, and radiation effects of these weapons from above and underground testing; as technological developments in the speed of delivery systems reduced options for population response; and as the doctrine of mutual assured destruction [MAD], became the accepted mechanism for ensuring nuclear stability. Since the weapons were so catastrophically powerful, and since both the United States and the U.S.S.R. could assure the destruction of the other were one to initiate an exchange, civil defense programs for the U.S. population in the nuclear age were allowed to dwindle into irrelevance.¹

Now, again in response to developments in weapons systems, civil defense has re-entered the arena of national debate, promoted with a more explicit strategic rationale than ever. The weapons are more lethal, the scenarios more brazen, and the world peace more tenuous. As physicians committed to sustaining the health of our society and prepared to participate in all aspects of disaster management, the aims of civil defense in most contexts would be harmonious with our own. In the setting of nuclear war, however, a circumstance which engulfs us all in devastation of unprecedented scale, we submit that civil defense cannot ensure conditions for post-attack survival. To persist in planning as if it could divert the nation from its major task—the pursuit of a sound, comprehensive, bilateral disarmament agreement and the prevention of nuclear war.

The discussion that follows will first approach civil defense from the standpoint of the strategic uses such planning now serves and the psychological effect such planning may have. In the second section, crisis relocation, the current civil defense program, will be examined from the perspective of feasibility. The final section will analyze issues of post-attack survivability.

I. STRATEGIC AND PSYCHOLOGICAL USES OF CIVIL DEFENSE

Changes in military strategy to keep pace with technological developments in nuclear weaponry have in the last few years contributed to the replacement of the MAD concept of deterrence, based on parity, with the notion that stability can derive from superiority of arms. The United States has now openly declared its

¹ B. W. Blanchard "American Civil Defense 1945-1975: The Evolution of Programs and Policies." University Microfilms International, Ann Arbor, Michigan, 1980, pp. 1-19. Joint Committee on Defense Production, "Civil Preparedness Review: Part I. Emergency Preparedness and Industrial Mobilization," 95th Congress, 1st session, U.S. Government Printing Office, Washington, D.C., February, 1977, pp. 3-38.

policy to be the acquisition and development of weapons systems that will produce unassailable nuclear superiority over the Soviet Union.² The need for superiority is based on the problems of waging war of any kind in the nuclear age. The validity of the concept is based on the notion of survivability. The civil defense is the method by which survivability is seen to be possible.

NATO doctrine calls for the first use of nuclear weapons in the European theatre if Warsaw Pact forces overwhelm allied conventional forces.³ It is recognized among many arms control authorities that a theatre use of nuclear weapons may well not remain limited, and that the United States and the Soviet Union might be drawn into a strategic, global exchange.⁴ In a world armed with nuclear weapons, for the United States to engage in war to protect overseas interests considered vital, it appears that the United States has to be willing to use nuclear weapons, and risk global nuclear war. If the United States has achieved overwhelming superiority in nuclear weaponry, however, it is assumed that the Soviet Union will not dare escalate from a tactical to a strategic exchange, since the United States will possess a sufficient number of warheads to survive a first strike (whether it be aimed at our military-industrial targets or directly at population centers) and then demolish the Soviet Union with a counterstrike of enormous magnitude.⁵

Here we encounter the question of "surviving" a Soviet first strike. For the United States to be in a position to retaliate with crushing effectiveness, the country must be able to withstand a 6,000 to 10,000 megaton Soviet attack. It is at this point in U.S. military strategic thought that civil defense becomes so important. The United States could not be willing to escalate to a strategic exchange if it were evident to the Soviet Union, the U.S. people, and the world in general that it had made no attempt to protect its population from Soviet attack. With such preparation, it is argued, the Soviet Union will take seriously our declared intentions; without such provision, it will be clear to all that the United States is unwilling to risk escalation from tactical to strategic warfare, and therefore probably unwilling to risk full-scale conventional confrontation (since it is probable that within days of a major conventional conflict between the interests of the United States and the U.S.S.R. the war will escalate to involve tactical nuclear weapons). In other words, without civil defense, the U.S. military cannot use its weapons. Civil defense closes the loop in U.S. offensive strategy and allows the United States to wage war.

As President Carter defined the role of the civil defense in Presidential Directive 41:

The United States civil defense program should enhance the survivability of the American people and its leadership in the event of nuclear war, thereby improving the basis for eventual recovery, as well as reducing vulnerability to a major Soviet attack;

The U.S. civil defense program should enhance deterrence and stability, and contribute to perceptions of the overall U.S./Soviet strategic balance and to crisis stability, and also reduce the possibility that the Soviets could coerce us in times of increased tension.⁶

This policy has been continued under the current administration. Among the objectives of the civil defense program as detailed in March, 1982, President Reagan sought to:

Enhance deterrence and stability in conjunction with our strategic offensive and other strategic defensive forces. Civil defense as an element of the strategic balance, should assist in maintaining perceptions that this balance is favorable to the United States;

Reduce the possibility that the United States could be coerced in time of crisis;

² L. R. Beres, "Nuclear Strategy and World Order: The United States Imperative," Working Paper Number 23, World Order Models Project, 1982. Institute for World Order, New York, N.Y., 1982 pp. 1-19. M. Bundy, G. F. Kennan, R. S. McNamara, and G. Smith, "Nuclear Weapons and the Atlantic Alliance," *Foreign Affairs*, Spring, 1982, pp. 753-768.

³ "Nuclear Weapons," The Report of the Secretary General of the United Nations, Autumn Press, Brookline, Mass., 1981, pp. 117-122.

⁴ H. Brown, Remarks delivered at the Convocation Ceremonies for the 97th Naval War College Class, Naval War College, Newport, Rhode Island, August 20, 1980. Bundy, et al. op. cit. G. Kistiakowsky, "Can a Limited Nuclear War Be Won?", *Defense Monitor*, 1981, v. 10, No. 2, pp. 1-4.

⁵ Bundy, op. cit. Howard, op. cit.
⁶ "Information Bulletin, Questions and Answers on Crisis Relocation Planning," No. 305, Washington, D.C., April 20, 1979, p. 3.

Provide for survival of a substantial portion of the U.S. population in the event of nuclear attack preceded by strategic warning, and for continuity of government, should deterrence and escalation control fail.⁷

It is always reassuring, when faced with an overwhelming situation, to have a plan for a way out. If confronting this overwhelming situation becomes a chronic condition, as it has for those of us in the nuclear age, having a way out becomes one of the many mechanisms we employ to avoid looking at where we are going. A civil defense plan appears to provide such an exit. The question is, for whom does civil defense planning appear to be reassuring?

There are two sectors to consider from the standpoint of Federal planning: the government bureaucracies involved in devising plans and implementing policy, and the American people, who are the subjects of the plans and the recipients of the policy. What is perhaps most significant about civil defense planning, and the policy that flows from it, is that the government bureaucracies are taking these plans most seriously and seem to be using them, as we have described, as part of government military strategy. Key officials in the Federal Emergency Management Agency (FEMA) now advocate civil defense planning as a viable means of protecting the U.S. population from attack. T. K. Jones, former advisor on Soviet affairs for Boeing and now Deputy Under Secretary of Defense for Strategic and Nuclear Forces, was recently quoted as saying that the United States would recover fully from an all-out war in just 2 to 4 years, given an adequate civil defense program. "Everybody's going to make it," he observed during the interview, "if there are enough shovels to go around . . . Dig a hole, cover it with a couple of doors and then throw 3 feet of dirt on top. It's the dirt that does it."⁸ George Bush pointed out in February 1980, that with a civil defense program "you have a survivability of command and control, survivability of industrial potential, protection of a percentage of your citizens and you have a capability that inflicts more damage on the opposition than it can inflict upon you."⁹ Eugene Rostow, in response to a question during his Senate confirmation hearings, said that nuclear war could be considered within a strategic context and that "Japan, after all, not only survived but flourished after the nuclear attack . . . Depending upon certain assumptions, some estimates predict 10 million dead on one side and 100 million on the other but that is not the whole population."¹⁰

Strategic planners promote the "rational" use of nuclear war and urge that the United States achieve the "ability to wage a nuclear war at any level of violence with a reasonable prospect of defeating the Soviet Union and of recovering sufficiently to insure a satisfactory postwar world order. . . . A combination of counterforce offensive targeting, civil defense, and ballistic missile and air defense should hold U.S. casualties down to a level compatible with national survival and recovery."¹¹ Such bureaucratic advocacy of civil defense planning suggests that the U.S. Government consider the use of nuclear weapons and the possibility of nuclear war a concrete eventuality, one to prepare to surmount with as much confidence as has previously been brought to contingency planning for other disasters.

The response of the American public to civil defense planning or nuclear war is evolving, as media discussions, educational programs, and government planning efforts become more widespread and detailed. Federal planners have found important allies in one section of public opinion, however—the survivalist movement.¹² This movement has attracted much attention and many adherents in those parts of the country most distant from target areas, most comfortable with wilderness conditions, and most individualistic in current life-style and political outlook. Civil defense planning falls right into behavior patterns survivalists can easily adopt: learn to travel light, live off what you carry, depend on others

⁷ Federal Emergency Management Agency, Office of Public Affairs, News, Release No. 82-26, Washington, D.C., March 30, 1982, p. 2.

⁸ T. K. Jones, as quoted in Los Angeles Times interview by R. Scheer, January 15, 1982, p. 22.

⁹ G. Bush, as quoted in an interview with Robert Scheer of the Los Angeles Times, cited in February 17, 1980, The Washington Post, in answer to the question, "How do you win a nuclear exchange?"

¹⁰ E. Rostow, in confirmation hearings before the U.S. Senate Committee on Foreign Relations, Government Printing Office, Washington, D.C., June 22 and 23, 1981, p. 49.

¹¹ C. Gray and R. Payne, "Victory is Possible," Foreign Policy, No. 39, Summer 1980, p. 14, p. 19, as cited in Beres, *op. cit.*, pp. 19-20. Issues of The Journal of Civil Defense, (The American Civil Defense Association, P.O. Box 910, Starke, Fla.), articulate this trend.

¹² See issues of The Journal of Civil Defense, (The American Civil Defense Association, P.O. Box 910, Starke, Fla., 32091).

as little as possible, avoid crowded situations, and take care of yourself no matter what happens. The concept of fleeing to rural areas and learning to live off what the land may have holds few surprises, survivalists believe. Pamphlets, books, and journals supporting this point of view have proliferated in the past few years. Industries have developed, catering to needs for the best shelter equipment, water purifiers, masks and decontamination kits, self-help medical supplies and instructions, home generators, and effective methods for protecting what you have from someone who may try to come take it away. Survivalism has attributes of the American individualist gone wild. In their public statements there is little recognition of the interdependence of life and their own ties to the civilization and economy they so casually write off. To quote from a prominent spokesman in their movement:

I think it is probably true that a nuclear war would severely disrupt, perhaps destroy, the economic and social structure of the United States and Western Europe. . . . It is very egotistical of us, however, to state so blatantly our belief that the destruction of America . . . would be the end of civilization . . . it will not vanish just because our cities have been badly used. Don't worry about civilization. Concentrate on staying alive to enjoy it.¹³

Nor do they appear to understand the realities of the post-attack world. They assert that although the targeted areas include two-thirds of the U.S. population they comprise only 5 percent of the U.S. land area,¹⁴ but with this statement they do not examine the short-term radiation and long-term ecological effects on the areas not hit by blast or devastated by fire.

Civil defense planning, then, seems to be serving the psychological purpose of allowing Federal officials to think that they have taken care of things back home, and of fueling a grandiose sense of self-reliance among some members of the American public. It gives officials and some members of our society a false sense of mastery which protects them from a confrontation we are asking everyone to make, a recognition that we are dealing with a threat qualitatively different from anything we have ever been compelled to face, a threat that requires of us a qualitatively different kind of response.

II. CRISIS RELOCATION PLAN

In analyzing the current U.S. civil defense plan, crisis relocation, questions of feasibility require attention. The focus in this section will be as much as possible on medical issues. A full analysis of the logistics of evacuation and shelter, the transportation and administrative details, is beyond the scope of this paper. The perspective to bear in mind, however, is that even if every aspect of evacuation and shelter went according to plan, even if all systems functioned as well as anticipated by FEMA, does crisis relocation in the setting of nuclear war promote a survivable situation? A response to this question, an evaluation of demographic survival in the first 2 years after attack, is the subject of the third section.

FEMA attack scenario and plan

A nuclear attack on the continental U.S. delivering 6,000 to 10,000 megatons and occurring without warning would kill 120-150 million of the U.S. population outright and millions more would die from the lethal effects of fallout, hunger, exposure, and disease. Civil defense officials have acknowledged that protection of the population in this setting, without massive commitment to in-place blast sheltering, would be unfeasible. FEMA has therefore concentrated its efforts on planning for a strike in a setting where the United States would have a 3- to 5-day period of advance notice. This setting is defined by a certain interpretation of Soviet strategy and nuclear war held by FEMA and a section of U.S. military opinion. In any attack on the United States, it is assumed that the Soviet Union would seek to destroy major military installations and industrial plants. About 250 cities with populations over 50,000 each, comprising two-thirds of the U.S. population or about 145 million people, are located directly within the blast effects of these targets. FEMA also assumes that the Soviet Union would not launch a pre-emptive strike on the United States without first protecting their own population, as much as would be possible, from the effects of a U.S. counter-attack, and

¹³ B. Clayton, "Nuclear Nonsense", *Survive*, Fall, 1981, p. 36.

¹⁴ Defense Civil Preparedness Agency, "Information Bulletin, Materials for Presentation on Nuclear Protection," No. 306, Washington, D.C., April 26, 1979, p. 3.

would thus first execute their own civil defense plan and begin evacuating all major cities and population centers around industrial plants.

Consequently, as FEMA foresees the course of events, in a setting of heightened world tension, such as conflict in the Persian Gulf, Eastern Europe, or the Caribbean, the Soviet Union might activate its civil defense plan. The U.S. satellite intelligence system would pick up this population movement, alert our military forces and civil defense system, and the United States would then have from 3 to 5 days (the estimated length of time for the Soviet civil defense plan to take place) in which to prepare for the anticipated Soviet pre-emptive strike. With these several days of warning, the FEMA plan calls for evacuating 145 million people from 250 cities to rural areas, where they should seek food and shelter with friends, or report to central camp areas where they would find food and supplies stockpiled and would have to build fallout shelters before the Soviet attack.¹⁵

Feasibility issues

The organizational and financial commitment required to put such a plan into operation might be seen as escalatory and provocative, creating a civil defense posture that purports to prepare us to survive nuclear war. The plan is politically very cumbersome, in that the costs of estimating inaccurately are very high. If the President were to misread the Soviet Union's intentions and activate our civil defense plan unnecessarily, there would ensue at least a major erosion of public confidence with significant economic loss and social hardship. At most, this large-scale evacuation could prompt the Soviet Union to launch a pre-emptive attack out of fear that the United States was planning to launch a strike of its own.

The estimate of 250 cities is conservative, assuming the Soviet Union would not primarily target population centers or re-target once crisis relocation were put into effect. Evacuating millions of people in a matter of days creates problems of social control and systems use totally without precedent. Evacuation routes are impractical: the southern half of Boston is to evacuate to Cape Cod, past the Pilgrim II nuclear plant, certain to be a target in itself, across one narrow bridge to the Cape, where sanitation facilities and water supplies can barely support the current influx of summer tourists. Destinations are casually designated, with little regard given to social reception, short-term shelter and food requirements, let alone long-term residence.

A sobering administrative problem is that completing the evacuation plans will require another 8 to 10 years, at current levels of funding; the sheltering components will take another 8 to 10 years of planning.¹⁶ We are brought to the late 1990's, at which point American demographic patterns will have shifted sufficiently to render the evacuation plans obsolete. It is also apparent that unless arms control efforts are successful, the world will not have stood still, and by the late 1990's the Soviet arsenal will be able to blanket the continental United States with blast as well as radiation effects, making population movement irrelevant.

Public health problems of the evacuation and shelter period

It is instructive to examine some of these feasibility issues from an epidemiological perspective. FEMA proposes moving 145 million people an average of several hundred miles by air, road, rail, and water, over a 3- to 5-day period. This population constitutes a vast migrant social system, characterizable by its own epidemiology of public safety and public health. What this social system encounters, in terms of crime and disease, during its 5-day existence, will be derivable partly from what can be expected on a national or regional average for any 5-day period for that number of Americans. What variables are introduced by disruption, fear, and migration, what will be special to the refugee aspect of this social system, can only be a matter of speculation.

If we look at the evacuating population of New York City as an example, we see about 7.5 million people moving to upstate and western New York State over a 5-day period. An average 5-day period in New York City sees 404.5 deaths from

¹⁵ Ibid. DCPA, No. 305, op. cit. DCPA, "Information Bulletin, Research Report on Recovery from Nuclear Attack," No. 307, Washington, D.C., May 10, 1979.

¹⁶ Committee on Armed Services, "Hearings on Military Posture and H.R. 2970, Part 6, Military Personnel and Civil Defense," 97th Congress, 1st session, Government Printing Office, Washington, D.C., 1981, pp. 797-789.

heart disease, 1367.5 live births, and 944.5 total deaths.¹⁷ It seems reasonable to estimate at least the baseline incidence of seizures, insulin reaction, strokes, respiratory arrests, and gastrointestinal hemorrhages. To what extent the stress of the evacuation would promote stress-related morbidity and mortality is unclear. A study of the incidence of depression and suicide among bombing victims in Northern Ireland from 1963 to 1977 noted that when social conditions promoted violent behavior in all sectors of the community, the incidence of severe depressive episodes and suicides declined, paralleling an increase in criminal and homicidal behavior. Further data for violent crime in New York City reveals a 5-day average of 21.6 murders, 44.5 violent rapes, 520.5 aggravated assaults, and 2733.6 burglaries.¹⁸ One factor promoting an increase in the crime rate will be the obvious extent to which surveillance must be dispersed. The usual forces for law and order will be so occupied helping the population cope with an extraordinary situation that they will have less time and attention to spend on monitoring and controlling more deviant behavior. Another factor supporting an increased crime rate is that everyone, even people not usually prone to violence, will be so stressed by the pressures of time, fear of the unknown, and anger at traffic that survival mechanisms will be at peak force and people may react more violently if frustrated. Witness violence during the 1974 oil shortages at gas pumps across the country. The estimate of handguns held in New York City, legal and illegal, is well over a million.¹⁹

Deciding to what extent the medical population should be deployed to help with this volume of morbidity and mortality en route will constitute a complex administrative decision. Ascertainment of need will be haphazard: how will someone caught in traffic on the Triboro Bridge notify authorities that a passenger in his car seems to be having a heart attack? Access presents another problem: even if notification of need reaches a response station, how will the medical personnel get to the stranded victim? Given the imbalances between the resources available and the need, it might seem realistic to dispense with any attempt to affect the situation and concentrate all efforts on providing medical support at the destination sites. A presence of medical support, such as via helicopter, even if grossly inadequate, might be essential, however, from the standpoint of maintaining public confidence.

Similar questions from an epidemiological standpoint can be directed at the shelter component of crisis relocation. The logistical problems of constructing effective shelters (with protection factors, or PF, of at least 25)²¹ within the postulated time constraints invites future analysis. Here we examine some of the health considerations produced by subjecting a population such as that of New York City to a minimum 30-day stay. (This is the minimum. Data exist to suggest the stay may have to be much longer in certain areas.)²²

The shelter situation requires that everyone remain in the shelter until ambient fallout levels have decayed to nonlethal levels. Ventures out into the environment before that time will increase risk of radiation injury, depending on the level of radioactivity and duration of exposure. Assuming that everyone stays in the shelter until an all-clear is announced, each shelter will have to be stocked with sufficient food and water for a 30-day stay by its occupants and waste material will have to be sequestered within the confines of the shelter. The problems of coping with this volume of human waste in a hastily constructed fallout shelter should not be minimized. Storage in chemically treated containers will create volume requirements that must be anticipated at time of construction. An increased risk of odor pollution and disease can be expected with some certainty.

Air ventilation will demand close attention. Radioactivity, in the form of alpha and beta particles, will be airborne and will pass through standard commercial

¹⁷ Phone communication with Martin Seigir, Assistant to the Chief of Vital Statistics, Department of Vital Statistics, New York City, January 26, 1982, data for 1980.

¹⁸ H. A. Lyons, "Civil Violence—The Psychological Aspects", *Journal of Psychosomatic Research*, v. 23, 1979, pp. 373-393.

¹⁹ Phone communication with Simeon Wright, Staff Analyst, Crime Analysis Unit, New York City Police Department, January 19, 1982, data for 1981.

²⁰ Phone communication with Dr. Paul Blackman, Director of Research for the National Rifle Association, January 5, 1982. His findings show 600-800,000 handguns, owned illegally in New York City but notes that law enforcement agencies "estimate" the number to be much higher.

²¹ Office of Technology Assessment, "The Effects of Nuclear War," OTA, Washington, D.C., 1979, pp. 49-50 140-145.

²² C. M. Haaland, C. V. Chester, and E. P. Wigner, "Survival of the Relocated Population of the U.S. After a Nuclear Attack," Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1976, p. 39.

air systems. People in shelters will therefore be at risk from inhalation of internal emitters and, depending on the density of fallout, may find that contamination from the air system deposits surface radioactivity within the shelter. Air filtration systems to remove alpha and beta contamination are not widely developed for commercial use.

Monitoring reasonable environmental temperatures within the shelters may pose significant problems if the attack scenario and crisis relocation are activated in winter. Hypothermia and morbidity from cold exposure can intervene if environmental temperatures are sustained at 40 degrees F, especially if people are undernourished, damp, and stressed. Conversely, environmental temperatures above the mid-80's will increase fluid requirements for all people, and if maintained over a period of days, can induce problems of heat stroke in the elderly or chronically ill.

The ongoing medical needs of a sheltered population will not be met in the ways in which most people have come to expect. Again, the infrastructure for the delivery of health care will have markedly changed. Those with chronic illnesses requiring daily medications must have their own 30-day supply. (Where to obtain supplies thereafter, with 80 to 90 percent of the pharmaceutical industry destroyed,²³ has not been addressed.) These people include those with diabetes, seizure disorders, cardiovascular and pulmonary disease, and steroid-dependent conditions. In a 30-day period, this shelter population, even inactive, can be expected to sustain a number of fractures and lacerations that will have to be handled on a first aid basis by other members in their household.

Gastrointestinal disease will create serious difficulties by increasing fluid requirements, thus constricting group supplies and contributing to production of waste. Risks of death from dehydration will be greater, since the option of intravenous fluid administration may well not be available. The overall incidence of gastroenteritis, as well as most infectious and communicable diseases, will probably be higher than baseline, because of the close proximity of human beings to each other, their intimate proximity to human waste, and the interacting effects of radiation exposure and malnutrition.²⁴

Thromboembolic disease will also probably increase in incidence, because of the enforced sedentary posture of the sheltered population. Labor and delivery will still occur, although obstetric complications could in general not be treated and fetal and maternal morbidity and mortality could be expected to rise.

Plans for the disposal of dead bodies will need to be devised. It should be recognized that of all the pressures leading people to leave the shelters prematurely, removal of corpses might prove most powerful. Requiring people to continue to remain in the shelters with a dead body might prove impossible to enforce, medically inadvisable, and psychiatrically unwise. If people are allowed to leave the shelter to dispose of bodies, the plan should restrict their exposure time to a minimum, perhaps by having graves, either individual or mass, dug in advance. The option of body bags is currently under investigation by FEMA authorities, who are considering furnishing each shelter with a number of bags depending on number of occupants and calculated 30-day death rate.²⁵

Psychological stress in the shelters might be severe. Despite attempts to group families and friends together, undoubtedly many people of different ethnicity and class will be thrust into close quarters. Conflicts over food, water, space will be exacerbated by differences in life-style and coping patterns. The overall terror of impending attack and anxiety about outcome will certainly add a dimension of tension difficult to estimate. Even very stable people will find their equilibrium stressed by the tremendous social disruption, disorientation about future security, anger and grief at the turmoil and destruction, guilt about personal behavior.

III. SURVIVAL IN THE POST-ATTACK WORLD

This explication of some of the major problems and unknowns involved in crisis relocation has been marshalled to support the first proposition, that it is highly unlikely if not impossible for this process to occur as planned. Section

²³ R. L. Goen, R. B. Bothun, and F. E. Walker, *Potential Vulnerabilities Affecting National Survival*, Stanford Research Institute, Menlo Park, Calif., 1970, pp. 15-33.

²⁴ H. Abrams, "Medical Problems of Survivors of Nuclear War", *New England Journal of Medicine*, v. 305, No. 20, Nov. 12, 1981, pp. 1226-1232.

²⁵ Personal communication from Robert Carpenter, Chairman of the Emergency Preparedness and Disaster Committee, National Funeral Directors Association.

III will examine grounds for suggesting that even if crisis relocation were to occur as planned, survival would be unattainable for a much greater fraction of the population than FEMA has estimated, and far more grim for the few who attempt it.

Survival studies

Current civil defense planning is based on an optimistic assessment of risk—i.e. that things will work well and proceed as planned. This optimism is at variance with serious planning in other realms, where, for instance, engineers plan for worst case scenarios and use materials tested to withstand conditions more severe than expected on the basis of past experience. Official assertions that with crisis relocation 80 to 90 percent of the U.S. population will survive a full-scale nuclear war and rebuild our society in 2 to 4 years have been met with widespread public skepticism. In response, FEMA officials have claimed that their projections are based on careful evaluation of extensive research. This claim does not withstand close scrutiny.

Since the early 1970's the Defense Civil Preparedness Agency (DCPA) and then FEMA have contracted with private and government consultants from Rand, Stanford Research Institute, Systems Research Corporation, and Oak Ridge to produce background reports on issues relating to crisis relocation response to nuclear war. FEMA authorities refer to these reports, now numbering approximately 370, to support their generalizations about population movement, attack parameters, and survival fractions.²⁰ Analysis of some of the more frequently cited reports reveal a range of problems arising from exclusive reliance on the data and conclusions they contain. The community of authors derives from a small group of consultants and closely overlaps, so that many of the same people write several reports and cross-reference themselves and their associates in citations. Crucial generalizations about attack parameters, radiation fall-out patterns, and social and economic effects derive from only a few main studies with the others drawing on these estimates to form the basis for their reports. The conclusions of the reports are often phrased more optimistically than the data within the reports would support. Much attention is devoted to transportation logistics and shelter construction, and very little to assessments of the post-attack situation beyond the first 30 days. In sum, although these studies contain interesting data, they offer less relevant, independent, or comprehensive information than one might initially expect from the list of titles. They provide insufficient grounds for FEMA's sanguine interpretation of probable outcome after a nuclear war.

Crisis relocation, however, has no intrinsic value unless it can be shown that the reduction in immediate casualties it might afford can be sustained during the post-attack period. If crisis relocation serves merely to forestall casualties, to substitute immediate death in the cities for a more protracted but nonetheless certain death in relocated areas, then it is pointless for the United States to proceed with a plan that spells such convulsive, cataclysmic disruption of national processes.

An estimate of survivability in the post-attack world becomes key to this policy decision. The research on this subject has only just begun. The following discussion will describe some of the pivotal factors influencing survival, summarize some of what is known, and define areas requiring further investigation. What is initiated here must be viewed as a most preliminary suggestion for a study that needs to be done.

The concept of survivability used in this discussion falls somewhere between the most sparse definition, biological persistence of the species, and the most inclusive, maintained potential to recreate modern American society. Survivability will be seen as possible if the material conditions for sustained population growth can be met. After a full-scale nuclear war on the United States, the factors affecting such sustained growth of population are:

(1) *Radiation effects.*—Both immediate consequences of initially high levels of radiation exposure and the intermediate-term effects of chronic exposure to moderate levels will be considered.

(2) *Food supply.*—Attention must be extended beyond the first few weeks to examine subsequent harvest potentials.

²⁰ Committee on Armed Services, op. cit., pp. 848-855. Massachusetts Civil Defense Agency, "Crisis Relocation Planning . . . Questions and Answers," Framingham, Ma., no date, p. 30.

(3) *Infectious disease and epidemics.*—Discussion includes changes in the incidence of diseases known to be endemic in the population, resurgence of diseases now rare in North America, and synergism with effects of radiation exposure and malnutrition.

(4) *Alterations in the ecosystem.*—Ecological consequences of weapons explosions include effects of radiation exposure, climate change, ozone depletion, dust production, and soil erosion.

(5) *Psychological will to live.*—Whether people will have the psychological strength to continue the struggle for existence and procreation may remain the most fundamentally significant factor and perhaps the one most difficult to estimate.

Suggesting a demographic perspective, the following discussion examines the effects these factors will exert on the birth and death rates in the post-attack population.

The post-attack world

The people who remain will not recognize their world when they emerge from the shelters. Many familiar natural landmarks and most man-made ones will have been destroyed. The urban areas, home to most Americans, will be in rubble, and little will be left to draw people into the highly radioactive dust of what were once the downtown centers of life. Fires and blast effects may have destroyed or damaged much of the rural environment. Radioactive contamination of the land and water will present an incessant, uncertain hazard.

Meeting needs for shelter, food and water will be paramount. Shelters may still have to be used as home, since most of the nation's housing stock will have been destroyed. Destruction of the petroleum and much of the coal industries may force dependence on wood for fuel.²⁷ Building even rudimentary housing and foraging for wood takes energy. Food supplies will be very low. Food production will depend on many uncertainties, including availability of seed, extent of soil contamination, and season of the year.

Sanitary conditions will be primitive. Sewage and water systems will for the most part have been destroyed and makeshift ones may be inadequate. Millions of decomposing corpses from the attack and shelter period will require immediate burial or cremation. Insects, comparatively resistant to radiation and released from the constraints of their pre-attack predators (all of whom share radiation sensitivities more equivalent to human thresholds) will multiply.²⁸

Radiation effects

Much is not known about the extent and intensity of fallout levels after a nuclear war on the United States. Uncertainties about attack parameters begin the list of unknowns. From the standpoint of an individual weapon release, it is estimated that a 1 megaton bomb ground burst with 50–50 fission-fusion characteristics would yield a radiation rate at 1 hour of 500 to 1,000 rads over 1,000 square miles.²⁹ A 1980's attack on North America on the scale of the CRP-2B model of 6.559 megatons would release lethal fallout over 5 million square miles, or approximately the area of the continental United States.³⁰ Targeted urban areas, if receiving several megatons at groundburst, might experience greater levels of fallout, ranging over 10,000 rads at 1 hour after explosion. It is estimated in the CRP-2B model that approximately 60,000 square miles of the United States would be so affected.³¹ Whether such an attack scenario is most likely to apply, and whether the computer assumptions on which this projection of radiation release is based are valid constitute subjects for further investigation.

Survival in conditions of fallout delivering 500 to 1,000 rads per hour initially requires that the vast majority of the U.S. population be sheltered for at least 2 weeks in shelters with protection factors of at least 40.³² Survival within the 60,000 square mile area of higher radiation will be more problematic since this

²⁷ A. M. Katz, "Life After Nuclear War," Ballinger, Cambridge, Mass., 1982, pp. 161–172.

²⁸ V. W. Sidel, et al., "The Medical Consequences of Nuclear War", New England Journal of Medicine, v. 266, 1962, p. 1136, 1142.

²⁹ B. T. Feld, "Mechanics of Fallout", in "The Final Epidemic," R. Adams and S. Culen, eds., Educational Foundation for Nuclear Science, 1981, p. 114.

³⁰ Feld, *op. cit.*, p. 115.

³¹ C. M. Haaland, et al, *op. cit.*, p. 39.

³² Controversy over realistic protection factors is discussed in OTA, *op. cit.*, pp. 140–145.

area also encompasses that affected by intense blast and thermal effects. However, transit through or on the periphery of these or other unpredictable hot spots might well prove hazardous for several months after the attack.

Radioactive decay curves for the first 6 months after a thermonuclear weapons explosion can be approximated as a decline by a factor of 10 for every 7-fold increase in hours of elapsed time.³³ Thus, if lethal levels of 1,000 rads per hour swept across the United States, the dose in the hot areas at 49 hours, or 2 days into the shelter period, would be 10 rads per hour; at 2 weeks, 1 rad per hour; and at 100 days, or about 3 months, the rate would have decayed to .1 rad per hour. It is instructive to compare this dose rate with what has been set as the reasonable level for occupational radiation exposure in peacetime U.S. industry. According to the guidelines established by the National Council on Radiation Protection, a worker is allowed 5 rems per year, and a member of the general public 0.5 rems per year.³⁴ A dose rate of .1 rads per hour (for these purposes a rad is considered equivalent to a rem), will in 5 hours deliver what is considered a year's permissible exposure for a member of the general public, and in 50 hours deliver the same dose as that considered the maximum permissible annual dose for a worker. One week at that dose rate, .1 rads per hour, experienced 3 months after the attack, delivers 16.8 rads to each individual exposed.

Very little is known about the health consequences of this level of protracted radiation exposure. Published estimates are based on data drawn from Japanese victims of the bomb, radiation accidents, clinical radiation therapy experience, and animal experiments. It is known from this data base that doses of 20 to 50 rads will produce azospermia in men; that acute doses of 100 to 200 rads will produce fatigue, nausea, and vomiting in up to 50 percent of those exposed. An acute dose of 450 rads will kill 50 percent of the population, assuming adequate supportive medical care.³⁵ In the post-attack world, however, although a definite but uncertain number of people in the sheltered areas will receive significant doses of radiation within the first 2 weeks because of inadequate sheltering, the risks to the majority will be in subsequent cumulative effects of chronic exposures. It is simply not known what chronic exposure over months (to doses approximating 1,000 to 2,000 times that recommended now for the general public) means in terms of individual morbidity. The NCRP furnishes the following "Penalty Table" for estimated effects of chronic exposures on human beings.³⁶

PENALTY TABLE

Medical care will be needed by—	Accumulated radiation exposures (R) in any period of—		
	1 week	1 mo.	4 mo.
None.....	150	200	300
Some (5 percent may die).....	250	350	500
Most (50 percent may die).....	450	600	

It is noteworthy that "some" and "most" are not numerically transferable to a modeling situation. Nor are morbidity questions answered by "medical care will be needed by some (5 percent may die)." What kind of medical care will be needed? How sick are those who do not die? It is important to be able to estimate the proportion who will be able to work, who will suffer from nausea, vomiting, or diarrhea, who will be azospermic or anovulatory, who will be susceptible to infection. The extent to which moderate chronic radiation exposure will decrease fertility, increase fetal wastage, and increase mortality from other causes (malnutrition, disease) are questions which require much more attention before the balance between reparative cellular mechanisms and continuous toxic effects of radiation exposure can be reliably estimated. What little is known

³³ J. Smith and T. Smith, "Nuclear War: the Medical Facts, Medicine and the Bomb", *British Medical Journal*, v. 283, Sept. 19, 1981, p. 774. National Council on Radiation Protection, "Radiologica! Factors Affecting Decision-Making in a Nuclear Attack," NCRP Report No. 42, pp. 12-15.

³⁴ K. Kahn, "Health Effects of Nuclear Power and Nuclear Weapons," *Physicians for Social Responsibility*, Watertown, Mass., 1980, p. 30.

³⁵ *Ibid.*

³⁶ *Ibid.*, p. 38.

suggests that human beings have less efficient repair mechanisms in the face of repeated doses than many species of animals.³⁷

Long-term health consequences of radiation exposure are somewhat more understood and quantifiable, although much controversy still surrounds questions of linearity and threshold. New analyses of Hiroshima data suggest that induction incidence estimates should be at least doubled.³⁸ From what is known of the induction time and magnitude of these consequences, however, they are not relevant to the discussion of survivability in the first several years after nuclear attack. The incidence of malignancies, congenital malformations, and genetic mutations will increase significantly and will certainly alter longevity and quality of life, but will probably not have dramatic consequences for overall population growth. If the population survives, leukemia induction will begin to be expressed within 5 years after exposure, but solid tumor excess will not be seen until 10 to 40 years after the event.³⁹ Data that might have sobering relevance for quantifying the incidence of post-radiation cancer induction comes from a recent study of breast cancer patients, which suggests that highly fractionated doses of low-level radiation were as effective in inducing malignancy as larger, fewer doses.⁴⁰

This discussion so far has considered risks only from external gamma radiation. Ingestion or inhalation of radioisotopes contaminating food, water, and milk presents another source of radiation injury. Quantifying the extent of radioactive contamination of the post-attack environment and then attempting to calculate the internal radiation risk this contamination poses for human beings has not been accomplished. Isolated studies on plant and animal contamination suggest that the risk may not be insignificant.⁴¹

Food supply

Whether and for how long there will be enough food to support the population remaining after a nuclear war on the United States depends in part on the estimated population size. If crisis relocation is as effective as claimed, approximately 145 million people will survive the immediate effects and they will persist into the shelter period. Food supply in the United States depends on three main factors: production, processing, and distribution. A marked imbalance between production and population characterizes U.S. agriculture. The northeast is heavily dependent on food production west of the Mississippi, in the southwest, and Middle Atlantic states. The Pacific Northwest produces five times more food than its population requirements and the northeast produces only two-thirteenths of its food needs.⁴² Crisis relocation will not appreciably alter this relationship, since all people will move only 100 to 300 miles within their area.⁴³ Almost 80 percent of the food processing capacity of the country is located in high risk areas and would be destroyed in the war. Similar destruction of the distribution network (transportation systems and managerial personnel) can be anticipated.⁴⁴

It is important to distinguish among effects on the crops growing at the time of the attack, availability of grain stores, and potential for subsequent crop production. It is estimated that approximately 43 percent of the total crop under production will survive a full-scale 6,559 megaton attack.⁴⁵ This estimate represents the average of several variables⁴⁶ (time of year—June being the most damaging time for an attack to occur since radiation will kill germinating vegetation; kind of crop—grain, potatoes, soybeans, and rice listed in order of decreasing sensitivity to radiation). Because of destruction of distribution and processing facilities, however, it is not clear what percentage of the crop under production

³⁷ Ibid., p. 23.

³⁸ E. Marshall, "New A-Bomb Studies Alter Radiation Estimates", *Science*, v. 212, 22 May 1981, pp. 900-903.

³⁹ S. Finch, "The Study of Atomic Bomb Survivors in Japan", *The American Journal of Medicine*, v. 66, No. 6, June, 1979, pp. 899-901.

⁴⁰ J. D. Boice, Jr., et al., "Risk of Breast Cancer Following Low-Dose Radiation Exposure", *Diagnostic Radiology*, v. 131, June, 1979, pp. 589-597.

⁴¹ International Atomic Energy Agency, "Environmental Contamination by Radioactive Materials," Proceedings of a Seminar, Vienna, March, 1969, passim. D. W. Bensen and A. H. Sparrow, ed., "Survival of Food Crops and Livestock in the Event of Nuclear War," U.S. Atomic Energy Commission, National Technical Information Service, Springfield, Va., 1971, pp. 131-168, 187-190, p. 455.

⁴² J. W. Billheimer and A. W. Simpson, "Effects of Attack on Food Distribution to the Relocated Population," v. I. Systan, Inc., Los Altos, Calif., September, 1978, p. 2-1.

⁴³ Haaland, et al., op. cit., p. 27.

⁴⁴ Katz, op. cit., p. 157.

⁴⁵ C. M. Haaland, "Availability and Shipment of Grain for Survival of a Nuclear Attack", *American Journal of Agricultural Economics*, May, 1977, p. 361.

could be brought to the sheltered population. The breakdown of these systems, and the effects of lethal radiation, will make most of the nation's livestock supply unavailable for food.⁴⁶

Consequently, immediate nutritional support of the post-attack population will have to be supplied by the grain stored in local warehouses and elevators near production sites and in regional wholesale centers. In general, annual grain stores in the United States since 1945 have been sufficient to meet the immediate basic needs of the population (3,000 calories per day, or 2 pounds of raw grain per person per day.) There have been several years and 6-month periods, however, when such stores have not been adequate.⁴⁷ Assuming that the attack occurs during a time when the United States has sufficient stores on hand, there are still two large problems in relying on stored grain for support of the post-attack population. To begin with, it is not clear from the studies of food supplies in this setting what percent of the grain stores will survive a nuclear war on the United States. Grain stocks in the centrally located warehouses may well be destroyed by attacks on these risk areas.⁴⁸ Grain stored on local farms in the Midwest may be contaminated by fallout. The second problem is one of distribution. Approximately 55 million people in the post-attack population will be located in areas with zero to 10 days of food supply on hand.⁴⁹ Grain will have to be transported from remaining grain stocks in rural areas to these areas of need, within 2 to 3 weeks post attack. No food processing will be possible and raw grain will have to be boiled to be edible. No grain is reserved for animal use.

Conditions in the post-attack world will pose tremendous obstacles to this transport task. Most railroad lines, bridges, and roads will have been destroyed. At least 60 percent of all fuel stocks will have been consumed in the attack.⁵⁰ The one government-funded study that addresses in detail the question of supplying the post-attack population with food concentrates only on the question of fuel availability, assuming that a sufficient fraction of the trucking and rail transport system will survive to carry on this transport function. The study predicts that at an estimated transport rate approaching 6 percent of pre-attack 1970 capacity, 305,000 tons of grain will have been shipped in a 6-week period several trillion miles to the areas of need. Fuel supplies, this study estimates, "would last for 236 days, which is probably adequate to carry the nation through the survival stage into the recovery stage."⁵¹

The problems with this analysis are numerous. Disruption of transport networks cannot be assigned fractional values because of bottleneck dysjunctions. The rate and volume of grain shipped does not match need: 150,000 tons of grain are shipped in the first 2 weeks, furnishing 5.45 pounds of grain per person, assuming the population in need to be the 55 million with stocks of zero to 10 days post-attack, furnishing less than a 3-day supply for the entire 2-week period. The apparent destinations for this transported grain are listed as Boston, Hartford, New York City, Albany—all high risk areas and theoretically evacuated. Getting this grain supply to the host areas is the relevant, and more difficult task. What fuel exists in storage may not be near the trucks that may have survived the attack. Transport to the areas of need within the first two weeks may require transit through or on the periphery of intense radiation and engaging workers for this task may prove unrewarding. The study suggests that the transport effort will require an intact Federal Government and a form of Federal promissory note that local farmers will honor. Food hoarding or consumption of fuel supplies for any other task but transport of food is not considered. Finally, nothing supports the assumption that after 236 days, or 7.8 months into the post-attack period, the agricultural economy would have reached a "recovery stage." Many considerations suggest that, in fact, the food situation after the first 6 months post-attack will have become more severe.

After the first 6 months, all stored grain would have been consumed. The need to conserve seed supplies is not discussed in the government literature. Production factors in modern American agriculture include fertilizer, pesticides, heavy machinery, and irrigation. These all depend to a large extent on the existence of functioning refinery and petro-chemical industries, most of which would have been destroyed in the attack. Loss of fertilizer is estimated to result in

⁴⁶ Haaland, et al., op. cit., pp. 109-115.

⁴⁷ Ibid., p. 110.

⁴⁸ J. W. Billheimer and A. W. Simpson, op. cit., p. 2-3.

⁴⁹ Haaland, et al., op. cit., pp. 146-147.

⁵⁰ Haaland, op. cit., p. 364.

⁵¹ Ibid., p. 364.

50 percent decrease in major crop yield. Without pesticides, production of potatoes, vegetables, and fruits would be adversely affected, especially in the setting of the post-attack world where insect vectors will have increased disproportionately because of their relative radiation resistance. Loss of fuel for farm machinery and irrigation pumps will markedly reduce agricultural yields; it is estimated that reduction of petroleum use to 20 percent of pre-attack levels would cut farm production to 30 percent of normal.⁵²

Currently about 6 percent of the U.S. population is involved in agricultural production. Regardless of what extent a remnant of skilled farmers may survive the attack, the majority of the population will have had little experience with farming. People will be disoriented, hungry, perhaps ill from radiation and disease. The work required to prepare and plant fields may be beyond the capability of many.

Questions about soil and seed contamination, when people are very hungry, will most probably be dismissed, and some crops may be planted with little regard for radioactivity. Without fertilizer, pesticides, equipment, or skill, in a contaminated terrain infested by insects, planting such crops carries much risk of failure.

For all these reasons, the yield cannot be expected to compare with the pre-attack world. Estimates of production in the first several years after attack are beyond the scope of this discussion, but it is clear from the variables mentioned that problems with food production and distribution may exert significant negative constraints on population survival. In times of hunger, conserving seed from one growth's crop to use for the next season can prove socially and physically impossible. Areas that plan better and have better luck will become targets of attack from other groups in need. The situation in the course of two growing seasons could become most desperate. Living as they did on the margins of existence, two successive failures of the potato crop in 1846 and 1847 spelled death for close to 25 percent of the Irish population.⁵³ The starkness of this view needs no recourse to more conjectural possibilities, such as whether depletion of ozone or injection of atmospheric dust will make crop production in North America for the succeeding 5 to 20 years completely impossible. In this way, persistent famine could be seen to characterize the post-attack world.

Infectious disease and epidemics

The incidence and relative virulence of infectious disease will increase enormously in the years after the nuclear attack. Change in characteristics of both host and environment may lead to morbidity and mortality rates rarely before recorded. Environmental conditions post attack will create conditions for the abundant spread of disease: (1) crowding, during the shelter period and thereafter because of inadequate housing stock; (2) inadequate ventilation; (3) destruction of sanitary systems with accumulation of sewage and waste; (4) absence of refrigeration leading to food spoilage; (5) the presence of millions of corpses; (6) exuberant overgrowth of insects. The population that remains will in turn be able to offer only reduced resistance to disease. The complex interactive effects of stress, malnutrition, and lingering radiation will weaken human immune systems and physiological defense mechanisms to the point where people may succumb to diseases of previously low virulence. A study of the role of communicable diseases in the post-attack environment reveals that potential pathogens include familiar respiratory and gastrointestinal diseases of high endemicity but of low mortality in the pre-attack United States, and diseases of previously low or eradicated incidence in the United States which, because of the prevailing post-attack conditions, will recrudesce and contribute significantly to increased mortality. Among the first category are the viral and bacterial diarrheas, hepatitis, pneumonia, diphtheria, whooping cough, and tuberculosis. The second category includes cholera, malaria, plague, smallpox, and typhoid fever.⁵⁴

Throughout the history of the world, epidemic disease has struck populations with devastating mortality consequences. In some instances, as in the 19th century European cholera epidemics, the concomitant famine conditions clearly contributed to increased susceptibility of the population. In other cases, such as the annihilation of the Aztecs by smallpox or the deaths of one-third of Europe during the plague, the sudden introduction of a new virulent disease to which

⁵² Katz, *op. cit.*, p. 149.

⁵³ C. Woodham-Smith, "The Great Hunger," Harper, New York, 1962, pp. 411-412.

⁵⁴ Abrams, *op. cit.*

the population had no immunity made the relative contribution of other host factors irrelevant.⁵⁵

In the setting of the post-attack world, erosion of host defenses and environmental changes fostering the spread of endemic and epidemic disease may combine to create a potential mortality crisis of severe proportions. Public health and medical measures will be virtually non-existent. Most medical centers will have been consumed in the attack. No vaccines or antibiotics will be available beyond those stockpiled, since the pharmaceutical industry will have been destroyed. Strict rationing of antibiotics and vaccines will be necessary. In the absence of laboratory facilities, antibiotics will be prescribed at best on the basis of clinical hunch. Without supportive and intensive medical care, they can do little to combat some of the more dangerous bacterial diseases, and against most viral diseases are largely ineffective. Immunization, the only means of controlling diseases such as tetanus, measles, and poliomyelitis, may not prove effective for people whose immune systems have been weakened by radiation. Existing stocks of antibiotics and vaccines will be unable to combat whatever new pathogens or resistant strains may develop.

Under these conditions, estimates of plague incidence approach 12 percent of the population, with half of those contracting the disease dying. Within the first year after the attack, total deaths from all communicable diseases is estimated at 20 to 25 percent of the immediate post-attack population.⁵⁶ Those at the extremes of the age spectrum, the very old and the very young, will probably succumb first to the ravages of disease.⁵⁷ Virulent diseases such as plague, however, will strike everyone, and these effects on the age structure of the population are less easy to predict.

The cumulative mortality from infectious disease in the post attack world merits further careful study. What is known from examining the historical record may have somber application to this setting: death rates among societies living at the margins of agricultural production (and such is at best a characterization of post-attack America "show a remarkable tendency to recurrent, sudden dramatic peaks that reach levels as high as 150 or 300 or even 500,000 . . . the intensity and frequency of the peaks controlled the size of agricultural societies." ⁵⁸ Furthermore, "historical experience suggests that something like 120 to 150 years are needed for human populations to stabilize their response to drastic new infections." ⁵⁹

Alterations in the ecosystem

It is estimated that with the megatonnage exchanged in a full-force nuclear war, between 40 and 70 percent of the world's ozone layer could be destroyed.⁶⁰ This layer shields all animal and plant life from the effects of ultraviolet radiation and contributes to insulating the earth's surface from heat loss. Destruction of this amount of ozone protection will produce effects of uncertain magnitude of potentially enormous significance. Humans and animals would sustain third degree burns on exposed surfaces after one hour outdoors. Sunglasses would be necessary during all daylight hours. Whether plant photosynthesis could be maintained is uncertain, raising vast related questions of carbon dioxide and oxygen supply for the earth. It is also unknown the extent to which loss of ozone would expose microscopic plankton to toxic thermal injury and thus possibly compromise an essential component of the ocean food chain. This loss of ozone might reduce the earth's temperature by one to one and a half degrees centigrade, sufficient to increase the extent of the polar ice caps, eliminate the Midwest from crop production, and constrict suitable agricultural areas in the United States to only the most southern region. It would take at least 30 years for the ozone layer to regenerate, and during this period ecological derangements could be extreme.

⁵⁵ W. H. Neill, "Plagues and Peoples," Anchor, Garden City, N.Y., 1976, pp. 149, 176-185. E. A. Wrigley and R. S. Schofield, "The Population History of England 1541-1871," Harvard University Press, Cambridge, Ma., 1981, pp. 332-336. T. H. Hollingsworth, "Historical Demography," Cornell University Press, Ithaca, N.Y., 1969, p. 356.

⁵⁶ Abrams, *op. cit.*, p. 1231.

⁵⁷ N. Hanunian, "Dimensions of Survival: Postattack Survival Disparities and National Viability," Rand Corporation, Santa Monica, Ca., 1966, pp. 67-69.

⁵⁸ C. M. Cipolla, "The Economic History of World Population," London, 1962, pp. 76-77, cited in E. A. Wrigley and R. S. Schofield, *op. cit.*, p. 450.

⁵⁹ W. H. McNeill *op. cit.*, p. 51.

⁶⁰ National Academy of Sciences, "Long-Term Worldwide Effects of Multiple Nuclear-Weapons Detonations," NAS, Washington, D.C., 1975.

A full force nuclear attack would inject approximately 10^7 to 10^8 tons of dust and debris into the atmosphere, threatening in the short term to block the effects of the sun and cause measurable changes in ambient temperature. Destruction of much of the vegetation cover of North America in the initial and secondary fires of the attack would create further severe problems with dust and might markedly accelerate soil erosion.

Only an impoverished imagination would depict post-attack America as simply a frontier with fewer people in it than we have now. Eighteenth century America contained thousands of clean lakes and rivers, millions of square miles of virgin forest and rich land, and wildlife and plant forms of almost enormous abundance. The post-attack terrain may well be burnt barren of vegetation, stripped of animal life, infested by insects, and blistered by the unfiltered ultraviolet rays of the sun.

Psychological will to live

This discussion ventures into unexplored territory, proceeding from what is described in the disaster literature. A constant finding in retrospective studies of disasters and of people in extreme situations is that given a sufficient stress everyone will develop symptoms. The intensity of stress or the type of stress is more important in determining the nature of these symptoms than the premorbid personality of the individual.⁶¹ Dividing the disaster experience into time stages, phases of disaster response have been described specific to each stage. The impact phase of the disaster forces people into either alert, purposeful behavior or reactions of denial and disbelief. One large study projected that 12 to 25 percent of individuals would remain effective; 75 percent would be dazed and stunned; and 12 to 25 percent would be thrown into panic or acute confusion.⁶² A medical doctor witnessing the crowd fleeing Hiroshima in the first few hours after the attack wrote:

Those who were able walked silently towards the suburbs and the distant hills, their spirits broken, their initiative gone. When asked whence they had come they pointed to the city and said, "that way"; and when asked where they were going, pointed away from the city and said, "this way." They were so broken and confused that they moved and behaved like automatons. Their reactions had astonished outsiders who reported with amazement the spectacle of lone files of people holding stolidly to a narrow, rough path when close by was a smooth, easy road going in the same direction. The outsiders could not grasp the fact that they were witnessing the exodus of a people who walked in the realm of dreams.⁶³

After the impact, in the inventory phase, those who have coped will have a sense of mastery, while others will continue to evince dazed apathy. In settings of massive destruction, people become so isolated that psychoses deriving from sensory deprivation may occur. An increased incidence of situational psychoses has been noted with fatigue, physical trauma, or delay in rescue. Remedy and recovery phases may never be fully achieved, even after disasters on a scale incomparably smaller than nuclear war.

From studies of natural disasters, concentration camps, Hiroshima, Nagasaki, and Vietnam, a clear picture of what has been called the "survivor syndrome" emerges.⁶⁴ In Lifton's study of the Hiroshima survivors (the hibakusha, or explosion-affected people), the survivor syndrome had the following characteristics: a pervasive guilt, feelings of having failed those who had died; a residual image of ultimate horror; primitive anxieties of separation and annihilation; continuing fear of radiation effects with psychosomatic symptoms, and a sense of grotesque contamination, applied to radiation victims and internalized by them.⁶⁵

Generalizations from the Japanese experience and from other major disasters cannot begin to encompass the nature of psychological response after a nuclear

⁶¹ P. Hoeking, "Psychiatric Aspects of Extreme Environmental Stress", *Diseases of the Nervous System*, v. 31, 1970, pp. 542-545.

⁶² D. K. Kentsmith, "Minimizing the Psychological Effects of a Wartime Disaster on an Individual", *Aviation, Space, and Environmental Medicine*, April, 1980, pp. 409-413.

⁶³ M. Hachiya, "Hiroshima Diary," University of North Carolina Press, Chapel Hill, N.C., pp. 54-55.

⁶⁴ A. H. Barton, "Communities in Disaster," Anchor, Garden City, N.Y., 1970. B. C. Chamberlain, "The Psychological Aftermath of Disaster", *Journal of Clinical Psychiatry*, v. 41, No. 7, July, 1980, pp. 238-244. R. E. Cohen and F. L. Ahearn, Jr., "Handbook for Mental Health Care of Disaster Victims," Johns Hopkins University Press, Baltimore, 1980. F. C. Ikle, "The Social Impact of the Bomb Destruction," University of Oklahoma Press, Norman, Oklahoma, 1958.

⁶⁵ R. J. Lifton, "Death In Life," Simon & Schuster, New York, 1967.

war. Without historical precedent for an event that might destroy the totality of society, there are also no psychological precedents. The Black Death swept across Europe from 1346 to 1350, killing an estimated third of the populace, and leaving such misery in its wake that a witness, who succumbed, felt "the whole world, as it were, placed within the grasp of the Evil One."⁶⁶ According to one historian of the period:

Emotional response, dulled by horrors, underwent a kind of atrophy epitomized by the chronicler who wrote, 'And in these days was burying without sorrowe and wedding without friend-shippe.' in Siena, where more than half the inhabitants died of the plague, work was abandoned on the great cathedral, planned to be the largest in the world, and never resumed, owing to loss of workers and master masons and the 'melancholy and grief' of the survivors. The cathedral's truncated transept still stands in permanent witness to the sweep of death's scythe.⁶⁷

Yet the buildings that had been standing, remained. The infrastructure of communications, transportation, and economy persisted. The environment did not alter. When the plague had passed, the world could again become familiar.

An erosion of will to live, to struggle, to grow, to reach out to the world characterizes, for a period of time, most survivors of extreme disasters. What aborts the healing process and allows this apathy to persist in some people for the duration of their lives is not clearly understood. Enormity of loss, contributing to a sense of futility and absence of hope, may play a significant role. In the post-attack world there will be nothing, for a long time, to dilute one's encounter with death.

It might take some time before the cultural losses become real to the people who remain. Their attention, if it can be directed at anything, may be taken up with attempts to forestall hunger, cold, and disease. At some point in the months after the attack they may sink into consciousness the realization that the nation's libraries, museums, architectural treasures, and educational and scientific centers had all been destroyed. The bequests from past generations would have been consumed in a few hours.

It might also take months or years for an accurate assessment of the numbers of lives lost, assuming some people have the courage to sustain the inquiry. Initially, people in separate locales may think that they only have survived, or they may hold to the illusion that most people have lived, and the many they miss are safe in some other area. Guilt at surviving and denial of loss will most certainly be among the prevailing psychological reactions and may contribute to a persistent, widespread depression.⁶⁸

Summary of demographic effects

Questions of mortality during the first few years after a full-scale nuclear war on the United States require more comprehensive attention than they have received. The Office of Technology (OTA) analysis comparing estimates from the Department of Defense (DOD) and the Arms Control and Disarmament Agency (ACDA) provides the most extensive data available.⁶⁹ These mortality estimates are based on direct blast and thermal effects and on 30-day radiation effects. The ranges reflect varying assumptions about percent of the population evacuated and adequately sheltered. Other weapons effects, such as conflagrations and possible firestorms, have not been included in these estimates, because they are less predictable. It is assumed that only one exchange takes place, initiated by the Soviet Union. The mortality from the more realistic case, a protracted series of attacks, although considered to be much greater, has not been estimated in any published analyses. Higher order damage mechanisms, such as synergistic effects from radiation, stress, disease, and hunger during the first 30 days or into the first year, have not been quantitated.

Beginning from the preceding discussion of factors influencing prospects for survival in the post-attack period, the OTA data will be applied to a series of adjustments, in order to arrive at an assessment of cumulative mortality by the end of the first two post-attack years. These adjustments are based as much as possible on what is known about previous population encounters with radiation, hunger, infectious disease, environmental devastation, and stress. Much of what is projected has either never before occurred or never taken place on such scale, however, and the adjustments must be viewed as tentative, preliminary attempts

⁶⁶ B. W. Tuchman, "A Distant Mirror," Alfred A. Knopf, New York, 1978, p. 95.

⁶⁷ *Ibid.*, p. 96.

⁶⁸ B. C. Chamberlain, *op. cit.*

⁶⁹ OTA, *op. cit.*, pp. 140-145.

to arrive at an appropriate order of magnitude to describe the mortality that might evolve. The intention is to underscore the need to embark on a more thorough investigation of the demography of the post-attack world.

For the sake of simplicity, without sacrificing much accuracy, the discussion will begin with a range of immediate 30-day mortality taken from the OTA scenarios, representing the high figure of the low range and the low figure of the high range defined by DOD and ACDA data for an attack similar to the CRP-2B model used by FEMA. Both figures used assume 80 percent of the U.S. population has been evacuated to shelters in the host areas. The realism of that assumption can be challenged on other grounds; the discussion here focuses on survivability, granting a near-perfect performance of crisis relocation.

The mortality figures estimate only immediate direct blast and thermal effects and 30-day radiation fallout effects. Using the U.S. population base as 225 million, the low figure of 26 percent fatalities translates to 58.5 million deaths and the high figure of 32 percent to 72 million deaths. It is estimated, however, that in that attack non-fatal injuries would vary from 20 to 40 percent of total casualties.⁷¹ Taking the mid-range, or 30 percent, the number of non-fatal casualties for the low figure would be 25 million, and the number of such casualties for the high figure would be 30.8 million.⁷² Given shelter conditions, with absence of medical care, potential for disease, and synergism of radiation effects and stress, it is not unrealistic to assume that half of these non-fatal casualties would die at the end of 30 days. This number is especially conservative since some fraction of those injured would not have made it to shelters and would have died from more intense radiation levels, environmental exposure, and perhaps the effects of the fires.

With this adjustment, at the end of the 30-day shelter period, the total deaths are 71 million or 31.5 percent of the pre-attack population for the low figure, and for the high, 87.4 million deaths, or 38.8 percent.⁷³

During the remainder of the first year, some fraction of the population emerging from shelters will suffer from radiation illness, epidemics of disease, hunger or perhaps true famine, and environmental exposure. Enough is known about the effects of infectious disease during this period to suggest that first-year mortality might approach 25 percent of the remaining population. Given what is understood about levels of past mortality crises, and given the unprecedented sweep of devastation inflicted by nuclear war, it would seem plausible to suggest that the synergistic and aggregate effects of these other factors could claim the lives of another 15 percent of the population. The first-year mortality rate thus becomes 40 percent of the population surviving the shelter period. This figure is still less than that calculated for some of the worst mortality crises in past centuries, and so may, with further research, prove an underestimate.

This mortality of 40 percent of the population surviving the shelters would place the low range figure for the number of deaths at 61.6 million, and the high range figure at 55.04 million.⁷⁴ Total deaths by the end of the first year, summing deaths within the first 30 days and within the first year thereafter, become 132.6 million deaths or 58.9 percent mortality for the low figure and 142.44 million deaths or 63.3 percent mortality at the upper range.⁷⁵

The mortality pressure will not abate, however, at the end of whatever calendar marks the year. Persistent inadequacy of sanitation facilities and medical care would allow continued spread of infectious disease. Epidemics have been shown to occur in waves, striking new susceptibles over several generations, and this in settings where the health of the population was not constrained by radiation effects on the immune system and severe privation.⁷⁶ Supplies of food may well be lower at the end of the year than immediately post-attack, and, as dis-

⁷⁰ Ibid., p. 144.

⁷¹ Total casualties for low figure equals 83.6 million times 0.3 equals 25 million non-fatal. Total casualties for high figure equals 102.9 million times 0.3 equals 30.8 million non-fatal.

⁷² Low figure: 225 million times 0.26 equals 58.5 million deaths. High figure: 225 million times 0.32 equals 72 million deaths. Total deaths at end of 30 day shelter period: Low figure: 58.5 million plus (25 million times 0.5) equals 71 million or 31.5 percent. High figure: 72 million plus (30.8 million times 0.5) equals 87.4 million or 38.8 percent.

⁷³ Low figure: 225 million minus 71 million equals 154 million times 0.4 equals 61.6 million deaths. High figure: 225 million minus 87.4 million equals 137.6 million times 0.4 equals 55 million deaths.

⁷⁴ Low figure: 71 million plus 61.6 million equals 132.6 million deaths or 58.9 percent first year cumulative mortality. High figure: 87.4 million plus 55 million equals 142.4 million deaths or 63.3 percent first year cumulative mortality.

⁷⁵ W. H. McNeill, op. cit., pp. 184-186.

cussed, the fate of the subsequent harvest, were there to be one, would be problematic.

The second year could very arguably, then, be shown to exert the same high mortality rate, 40 percent, as the first. Such a sustained rate yields, on the low side of the estimate, a population of 55.5 million remaining, or 25 percent of the pre-attack population and on the high mortality range, 49.6 million remaining, or 22 percent of the pre-attack population.⁷⁶ By the end of the first 2 years post-attack, at least three-fourths of the pre-attack population would have died, with the cumulative deaths in those 2 years virtually equal to the numbers killed by the immediate effects of the weapons themselves.

These mortality calculations should be viewed as augmenting the baseline mortality of the U.S. population, but several factors work against a simple addition. Some of the people who would have died from cancer or stroke would die instead from burns or plague. The conditions for some causes of death, such as motor vehicle accidents, would no longer apply on a significant scale, since disruption of transportation networks and fuel shortages would eliminate most traffic. Consequently, integration of baseline mortality within the mortality of the attack and post-attack situation must await more detailed analysis.

A thorough search of the historical record and demographic literature would be necessary to define all the factors that spell extinction for one population exposed to severe mortality crises and permit re-growth for another. In general, populations who have survived these crises have done so by developing new immunities and increasing their birth rates. Both of these responses in the post-attack world may be dampened considerably because of the interactive effects of radiation and protracted malnutrition on the immune and reproductive systems.

Radiation exposure at sufficiently low levels to remain asymptomatic may still depress white blood cell counts. Lymphocytes, among the cells most essential to the immune system, are especially sensitive to radiation.⁷⁷ At a severe level of malnutrition, people become susceptible to infection, regardless of their immune status. The years it takes even basically healthy populations to develop new immunities may not be available to people in the post-attack world.

The effects of radiation exposure on the human reproductive system are complex and incompletely understood. Low radiation exposures, in the range of 20 rads, induced azospermia among survivors of Hiroshima for several months to years after the attack. Nine months after that attack, 10 to 12 men examined were effectively azospermic; 22 months after, another cohort of 32 men were examined, and approximately one-third had sperm counts in the range considered sterile. Menstrual disorders were common among women who had survived Hiroshima. Over 70 percent of those examined had irregular menses, with 78 percent returning to normal patterns by the end of 7 months. Fetal wastage in Hiroshima cannot be quantitated, since most pregnant women had been evacuated prior to the bombing. In Nagasaki, however, of the 177 pregnancies investigated, 18.6 percent ended in miscarriage, 6.8 percent in premature delivery. The incidence of microcephaly and other congenital malformations among all births was markedly correlated with in utero radiation exposure.⁷⁸

Conditions of the post-attack world raise doubts about the fertility potential of the remaining population, at least for the first 2 years. Infant mortality in these stark circumstances would undoubtedly exceed the high rate for the general population. Whether interest in establishing relationships and engaging in sexual activity would be sustained, and at what relative level, is no less important a question simply because it cannot be answered within the scope of this discussion. Loss of libido among Hiroshima survivors was frequently found for the first 2 to 3 months after the bombing,⁷⁹ and is a common feature of the survivor syndrome. The issue is raised, as with many others, to point out the extent to which our ignorance prevents us from quantifying very significant variables.

⁷⁶ Low figure: 225 million minus 132.6 million equals 92.4 million (times 0.4) equals 37 million deaths. 92.4 million minus 37 million equals 55.4 million remaining, or 25 percent of the pre-attack population. High figure: 225 million minus 142.4 million equals 82.6 million (times 0.4) equals 33 million deaths. 82.6 million minus 33 million equals 49.6 million remaining, or 22 percent of the pre-attack population.

⁷⁷ K. F. Hubner and S. A. Fry, eds., "The Medical Basis for Radiation Accident Preparedness," Elsevier/North-Holland, New York, 1980, p. 238.

⁷⁸ Committee for the Compilation of Materials, "Hiroshima and Nagasaki" Basic Books, New York, 1981, pp. 152-153. J. Smith and T. Smith, "Long-Term Effects of Radiation, Medicine and the Bomb", *British Medical Journal*, v. 283, 3 October 1981, p. 908.

⁷⁹ Committee for the Compilation of Materials, op. cit., p. 151.

Drawing together this series of adjustments to the OTA estimates of initial post-attack mortality, it is seen to be very possible that the remaining population of the United States, some 50 to 55 million people at the end of the first 2 years, might continue to be reduced to a fraction of that number in the ensuing decade. To reverse the oppressive mortality rates of the first 2 years post-attack might require a regeneration of technological and economic capacity beyond the reach of those who remain. The cumulative effect of these factors sustaining high mortality rates and suppressing birth rates suggests that human population dynamics after a full-force nuclear attack on the United States might persist in a negative pattern for several years. Survivability might seem less obtainable 2 years post-attack than upon emerging from the shelters.

CONCLUSION

As an element of military offensive strategy, civil defense in the nuclear age serves to delude Federal officials and a few members of the populace into thinking that nuclear war can be waged with relative impunity. As a public health program, current civil defense plans fall short of evaluating issues of feasibility, medical care, and long-term health consequences. The demography of the post-attack world, when evaluated in light of the factors affecting survivability, does not support bright predictions of outcome.

That the problems of crisis relocation are myriad has certainly not escaped civil defense planners. They recognize some of the major drawbacks with the plan and are in the process of designing other, more extensive plans that do not rely on massive population movements and 5 days of warning. These plans, involving construction of in-place blast-resistant shelters for the entire U.S. population, have not yet been advocated as public policy. But they are suggested, in the studies under contract to FEMA, and in FEMA congressional testimony. In a few months to a year we may see such proposals, recommending expenditures of \$100 billion, in fiscal year 1981 dollars.⁸⁰ So it is important for us to realize that the problem with civil defense planning in the setting of nuclear war lies not with the specific plan, but with the concept of survivability.

To evaluate that concept as applied to the post-attack world, we must stretch our understanding of what existence may or may not mean for those of us who might survive to see it. Our cities in rubble, our land burned and contaminated, our friends and relatives gone, future grimly foreshortened by prospects of famine and disease. Civil defense cannot change what the weapons can do.

If, after considered evaluation, it is seen that civil defense cannot protect the elements of our life and society we deem essential, then perhaps we need to call for an entirely different approach to the problem of nuclear war. If we begin with the understanding that nuclear war is not in any humane or civilized sense survivable, the path becomes clear: civil defense planning for nuclear war is delusory behavior and should not be encouraged. All our efforts must be directed at prevention.

[Dr. Eric Chivian from the International Physicians for the Prevention of Nuclear War, Inc., Boston, Mass., provided the following material.]

I was delighted to learn that I did not miss the deadline for the CD materials. Enclosed are the following:

1. My background paper for Working Group No. 7 at the 2nd Congress of International Physicians for the Prevention of Nuclear War on "The Role and Effectiveness of Civil Defense in Nuclear War." The members of the group included myself, Professor Alexander Leaf (former Chief of Medicine at the Mass. General), Professor Walfried Linden (a biophysicist who spent 10 years on the West Germany civil defense commission), Professor Donald Bates from Canada, Professor Lars Engstedt from Sweden, Professor Jacques Diezi from Switzerland, and Academician Leonid Ilyin (Chairman of the Soviet Radiation Protection Committee), among others (who have an asterisk by their names in the enclosed list of participants in the Preliminary Documents).

⁸⁰ L. W. Beilenson, "Selling Civil Defense", *Journal of Civil Defense*, December 1981, pp. 6-8. Committee on Armed Services, op. cit., pp. 816-821.

2. The summary of Working Group No. 7 and the Final Statement, endorsed by consensus by the entire congress of 160 physicians from 31 countries—from every Warsaw Pact and almost every NATO country.

I hope one or all of these documents may be included in the congressional record. I agree that a small pamphlet of the collected papers and presentations would be extremely useful.

INTERNATIONAL PHYSICIANS FOR THE PREVENTION OF NUCLEAR WAR,
2d CONGRESS, CAMBRIDGE, ENGLAND, APRIL 3-6, 1982

Working Group No. 7—Background Paper

THE ROLE AND EFFECTIVENESS OF CIVIL DEFENCE IN NUCLEAR WAR

I. Introduction

We have discussed the concepts of civil defence planning for a nuclear war from a medical and psychological perspective. Official policies in several countries vary considerably on the basis of geography, population distribution, and perceptions both as to the country's likely role in some future war and the nature of the attack expected.

Because IPPNW is dedicated to the prevention of nuclear war, and because it has already declared that a nuclear war between the superpowers cannot be limited, we examined civil defense measures from the point of view of an all-out nuclear exchange.

Despite the diversity of national efforts, three basic approaches to civil defense can be identified: evacuation, shelters in areas thought to be targeted, and shelters in areas where fallout is presumed to be the primary problem. What follows is a brief survey of these three modalities with some indication of their feasibility and effectiveness, particularly from a medical point of view.

II. Analysis of plans

Civil defence plans for nuclear war are based on a number of assumptions that do not withstand rigorous scrutiny. As physicians and scientists we make the following observations:

A. Evacuation Plans

1. To assume that a warning time of several days can be expected does not allow for surprise attack or accident.

2. To assume that it would be possible for a central authority to perceive the moment when an order to evacuate is necessary does not take into account the difficulty of arriving at an appropriate assessment during a crisis.

3. To assume that the population would understand the instructions and comply with government authorities, and that transportation would be available, exit routes remain open, essential workers stay on duty, and traffic be sustained at a steady flow, disregards the potential for panic, mass disorder, and system malfunction.

4. To assume that there would be no retargeting of evacuating or sheltered populations and that safe areas could be predicted does not take into account the rapidity with which retargeting is possible and the unpredictability of the attack pattern and weather conditions.

B. Sheltering in Areas Thought To Be Targeted

1. To assume that warning time would be adequate and warning systems effective ignores the speed of modern missiles which reach their targets in minutes, and the effects of the electromagnetic pulse (EMP) on communications. (For example, a high altitude air burst in the megaton range might burn out electronic systems throughout Europe.)

2. To assume that economically feasible blast shelters could be constructed in all target areas does not acknowledge the enormous expense involved for large populations or the capacity to overwhelm even blast-resistant structures with multiple surface bursts. (An incomplete programme for the U.S. has been estimated to cost over \$100 billion.)

3. To assume that the blast represents the major threat does not recognise the heat effects, oxygen depletion, and accumulation of toxic products of combustion produced by the massive fires, complicated further by the potential for firestorms.

4. To assume that adequate living conditions could be provided for the necessary duration does not consider the prolonged shelter occupancy time (up to several months) before the intensity of local radiation would have decayed to levels permitting exit for even brief periods of time.

5. To assume that radiation levels could be ascertained and communicated to shelter occupants fails to take into account the wide variability in local radiation levels, the vulnerability of communications and outside monitoring systems, and the risks posed to persons making measurements.

C. Sheltering in Areas Where Fallout is Presumed To Be the Primary Problem

1. To assume that areas affected only by fallout could be predetermined does not recognise the unpredictability of targeting scenarios and weather conditions.

2. To assume, again, that warning time would be adequate and warning systems effective overlooks in this case not only the effects of missile speed and EMP but also the difficulties of communicating with a more widely dispersed population.

3. To assume that existing shelters could be upgraded or new shelters built to provide adequate radiation protection does not address the time and physical energy required to construct realistic protection. (For example, to reduce the radiation by a minimum factor of 40 or more, necessary for shelters as distant as 160 Km. downwind from targets, requires surrounding a concrete basement with several cubic metres of earth. A cubic metre of earth weighs approximately 1600 Kg.)

4. To assume that material and psychological living conditions could be provided for the required duration does not fully address the need to regulate ventilation and temperature; to provide food and water; to maintain sanitation in the face of an increased incidence of respiratory illness, gastro-intestinal disease, hepatitis, and the possible need to dispose of bodies; to assure light, liveable space, and outside contact; and to preserve psychological stability and support.

CONCLUSIONS

On the basis of the above, it is our opinion that the feasibility and effectiveness of civil defence measures in the face of all out nuclear war are in serious doubt even when evaluated in the context in which their advocates argue for them.

When civil defence is examined in the light of longer term effects of an all out nuclear war, however, its advocacy becomes even less supportable. Civil defence can do nothing to mitigate the spread of disease and epidemics; the pervasive radiation effects; potential for widespread famine; breakdown of individual will and cooperative effort; destruction of health care, social and economic systems; and devastation of the environment. Whatever marginally increased survival civil defence might afford would be temporary, and offset by the hostile environment to which survivors would inevitably have to return and to which many would gradually succumb.

If these serious objections leave any hope of limited effectiveness of civil defence, that slim hope must still be weighted against the negative consequences of planning and implementing such programmes.

As physicians and scientists we hold that exaggeration of the value of civil defence may delude the public into thinking that nuclear war is survivable and may encourage governments to plan on that basis. The belief that a nation possessing nuclear weapons has an effective civil defence programme could be viewed with suspicion by its adversary. In this way, civil defence could be seen to exert a provocative and consequently destabilising influence on the conduct of international affairs. Efforts at civil defence by nonnuclear countries, such as Switzerland, invite the export and misapplication of both policies and technology that create illusions of protection among countries that would be targeted. Arguments that civil defence in these countries is for conventional war do not account for the high risk of escalation to nuclear war. Justifications for civil defence as preparation for peacetime disasters also must be critically examined. Finally efforts expended on civil defence direct resources away from necessary social programmes and may divert attention from the most important way of protecting people and enhancing national security: preventing nuclear war.

On the basis of our study, we conclude that there can be no effective civil defence against nuclear war, and recommend that whatever resources are used for the protection of the civilian population be devoted to the prevention of nuclear war.

[FINAL DRAFT]

THE ROLE AND EFFECTIVENESS OF CIVIL DEFENCE IN NUCLEAR WAR

SUMMARY

Civil defence concepts for a nuclear war were reviewed from a medical and psychological perspective and three basic approaches identified: evacuation, shelters in areas thought to be targeted, and shelters in areas where fallout is presumed to be the primary problem. Our analysis disclosed that these concepts are based on a number of assumptions that do not withstand rigorous scrutiny. The assumptions include: adequate warning time, an error-free central authority, a knowledgeable and compliant population, a near-perfect transportation system, no retargeting, tolerable shelter conditions, functioning monitoring and communication systems, and psychological stability.

We concluded that the feasibility and effectiveness of civil defence measures in the face of all out nuclear war are in serious doubt, even when evaluated in the context in which their advocates argue for them.

In addition, civil defence when examined in the light of long-term effects can do nothing to mitigate the spread of disease and epidemics; the pervasive radiation effects; the potential for widespread famine; the breakdown of individual will and cooperative effort; the destruction of health care, social, and economic systems; and devastation of the environment.

If these serious objections leave any hope of marginal effectiveness of civil defence, that slim hope must still be weighed against the negative consequences of planning and implementing such programmes. As physicians and scientists, we hold that exaggeration of the value of civil defence may delude the public into thinking that nuclear war is survivable and may encourage some governments to plan on that basis. The belief that a nation possessing nuclear weapons has an effective civil defence programme could be seen as *provo* active to its adversary and is consequently destabilizing. Efforts expended on civil defence direct resources away from necessary social programmes and may divert attention from the most important way of protecting people and enhancing national security—preventing nuclear war.

We conclude that there can be no effective civil defence against nuclear war.

[FINAL STATEMENT]

THE ROLE AND EFFECTIVENESS OF CIVIL DEFENSE IN NUCLEAR WAR

It has become increasingly important to examine the effectiveness of civil defense plans for a nuclear war, because they have been considered more seriously in recent years by several governments, including Canada¹, Sweden², Switzerland³, the United Kingdom⁴, the United States⁵, and the U.S.S.R.⁶ Each of these countries has stated in official publications that their plans exist to ensure the survival of their populations in the event of a nuclear war. In some countries, civil defense plans are further seen as an inseparable part of nuclear deterrent policy, increasing the credibility of the threat to launch a retaliatory nuclear attack. It is said by some analysts that a strong civil defense with significant survival capability therefore decreases the likelihood of a nuclear attack, because it makes clear to one's enemies that they could not win a nuclear war. Others contend that civil defense plans are not only futile but dangerous, in that they encourage a belief in the inevitability of nuclear war, support the myth that nuclear wars can be survived and won, and convince a country's adversary that preparations are being made for war. In this way, civil defense is seen as a major destabilizing factor that both fuels the nuclear arms race and increases the likelihood of nuclear war.

¹ "Eleven Steps to Survival," "Emergency Planning, The Queen's Printer, Ottawa, Canada, 1980.

² "Facts about the Civil Defence," The Swedish Civil Defence Administrator, Karlstad, Sweden, 1978-1979 edition.

³ "The Swiss Civil Defence," Federal Office of Civil Defence, Berne, Switzerland, 1980.

⁴ "Protect and Survive," Central Office of Information, United Kingdom, 1980.

⁵ "U.S. Crisis Relocation Planning", Federal Emergency Management Agency, U.S. Government Printing Office, Feb. 1981.

⁶ "Civil Defense—A Soviet View," P. T. Yegorov, I. A. Schlyakhov, N. I. Alabin (translated by the U.S. Air Force), Moscow 1970.

In all the plans, assumptions are made that are essential for the plans' success. These assumptions, relying on predictions of the likely patterns a nuclear war would follow, of the physical characteristics of nuclear weapons and their sequelae, of the behavior of large populations during and after major crisis periods, and of the ability of societies to reconstruct themselves after they have been destroyed, all need to be examined critically on their scientific and medical merits. A total civil defense plan must guarantee survival not only for the first weeks and months following a nuclear attack, but for the long term as well. Any plan that does not, does little more than prolong human suffering and delay mass death.

There are three basic models for CD plans: those that rely largely on individual initiative to construct private fallout and blast shelters (as in the United Kingdom), those that provide government-built public shelters (as in Sweden and Switzerland), and those that rely mainly on evacuation of people from high risk target areas and sheltering them in areas of presumed lower risk (as in the United States and U.S.S.R.). One could also divide the plans between neutralist countries that are unlikely targets for a nuclear war, and those which possess nuclear weapons or important strategic targets and are likely to be attacked.

The plans of the United States and U.S.S.R. encompass models No. 1 and No. 2—that is, both public and private sheltering would be required in the areas to which people had been evacuated, and the same principles of sheltering would apply. For this reason, the complete plan of evacuation plus sheltering will be considered here.

The following questions must be asked in evaluating any civil defense plan:

EVACUATION

1. Is it realistic to assure that there will be a warning time of at least 1 week (required for United States and U.S.S.R. plans) ⁷ to evacuate major target areas and build shelters? That is, will a nuclear war occur only after a slowly evolving international crisis or conventional conflict or should a surprise attack or an accidental nuclear war be considered equally likely?

2. Will it be possible to determine during an evolving crisis when a critical level had been reached at which point it would be definite that a nuclear war was inevitable so that an executive order for evacuation would be made, or would it be difficult to have a clear perception of the conflict. Moreover, would the enormous cost of removing a substantial proportion of the work force from the economy (145 Americans would be evacuated costing the economy approximately \$5 billion/day) and the danger that an evacuation by itself could initiate a nuclear war by appearing as an initial step to launch a 1st strike make such an order almost impossible to give?

3. Would an evacuation order be believed, and would the detailed instructions be understood by the evacuees? Or would compliance be minimal because of widespread public skepticism ⁸ about the ability of CD to save lives, and the inability to follow complex instructions during periods of great stress?

4. Is evacuation from highly populated areas logistically possible given the few exit routes, the likelihood of panic and stampede, and the uncertainty that public transportation workers would leave their families to take care of strangers?

5. Is it not possible that the evacuees would be hit by a direct nuclear strike, as they would be easily detected by surveillance satellites and missiles could be retargeted in less than 1 hour? If a nuclear attack had as its goal the destruction of the largest number of people, could this not be accomplished by hitting the highly-exposed evacuees?

6. Can "safe" areas be predicted in a nuclear war, or is it not possible to forecast the precise targets, the nature of the attack, and the weather conditions that would determine the direction and magnitude of fallout?

⁷ Canadian planners require 30 days.

⁸ A recent Boston poll showed 95 percent of the public did not believe that they could protect their families in a nuclear war, and a Gallup Poll (9/22-24/81) showed 86 percent of Americans thought their chances of surviving a "limited nuclear war" were at best 50-50. In the U.S.S.R., CD is commonly referred to by the acronym "Grob" meaning coffin.

SHELTERING

7. Can shelters in target areas be constructed to provide adequate protection against blast and fallout (see table 1).⁹ or would an enemy be able to increase the scale of attack so as to overcome almost any shelter? Will mass fires, especially firestorms, make such shelters crematoria, cooking and asphyxiating the occupants, as in Dresden and Hamburg? Will several surface explosions with their deep cratering make useless any shelters (such as subways) that were not more than 70 meters below ground?

8. Can shelters be constructed in the evacuated "safe" areas to protect the occupants against fallout? What materials are needed? Will it be possible to increase radiation protection factors for existing structures with dirt—or will frozen ground, mud, and the magnitude of the task make this impossible?

9. Will a significant number of shelter occupants, particularly the young, get radiation sickness and die?¹⁰

10. Will shelters be able to provide for the basic needs of the occupants—heat, water, light, food, ventilation, and medical care? Even if they were well stocked, would the supplies be adequate for the necessary shelter times, if radiation levels reached a few thousand Rems accumulated dose in the 1st week after attack, or if there were multiple attacks separated by days to weeks?

11. Will the conditions inside shelters, with probable crowding, high humidity, a lack of knowledge of what was happening outside the shelter (if the EMP destroyed radio and telephone transmission), possible darkness, the presence of sick and dying people, bad odors, and separation from family and friends lead to panic and desperation, making life inside shelters intolerable? Will people be likely to abandon shelters in the hope that radiation levels had returned to normal?

12. Will poor sanitation, crowding, poor ventilation, malnutrition, dehydration, and lowered resistance to infection (see figure 1)¹¹ make the shelter environment ripe for the spread of communicable diseases like hepatitis, the gastroenteritides, and respiratory diseases?

13. Will shelter stays last only 1-2 weeks (as several plans state) or will they be several weeks or even months? (See figure 2.)¹² How will it be possible to determine the radiation levels outside when fallout would be extremely variable, and accumulated radiation doses very difficult to calculate? Will the targeting of nuclear power plants increase shelter stays?¹³

14. Will "limited" nuclear war scenarios or sheltering in a country not directly attacked substantially alter the picture?

15. Will the post-shelter world be able to support life for the emerging occupants, or would the environment, the medical care system, and the social, economic, and political structure on which 20th Century life depends be so devastated as to make long term survival unlikely in the attacked countries? Further, will the destroyed lands result in an interruption of vital supplies of food, fuel, and raw materials even to countries not attacked, compromising their survival as well? Finally, will the psychologic state of the survivors of a nuclear war allow them to produce the superhuman, cooperative effort necessary to rebuild their societies?

Each of these questions must be answered in a scientific evaluation of nuclear war civil defense plans. If any one of the critical assumptions on which the complex evacuation and sheltering scenarios are based is invalid, it would severely compromise the expected survival capacity such plans predict. If more than one of these assumptions is invalid, the plans must be considered ineffective for ensuring long term survival following a nuclear war.

⁹ Rotblat, J., "Nuclear Radiation in Warfare," SIPRI, Taylor & Francis Ltd., London 1981.

¹⁰ Lindop, P. J., "Radiation Aspects of a Nuclear War in Europe," Conference on Nuclear War in Europe, Groningen, the Netherlands, April 22-24, 1981.

¹¹ Abrams, H. L. and von Kaenel, W. E., "Medical Problems of Survivors of Nuclear War—Infection and the Spread of Communicable Disease," *New England Journal of Medicine*, 305:1226-1232 (1981).

¹² Glasstone, S., and Dolan, P. J., *The Effects of Nuclear Weapons*, U.S. Department of Defense, 1977.

¹³ Fetter, S. A. and Tsiplis, K., "Catastrophic Releases of Radioactivity," *Scientific American*, 244:41-47 (April 1981).

TABLE 1.—10TH VALUE THICKNESSES FOR RADIATION

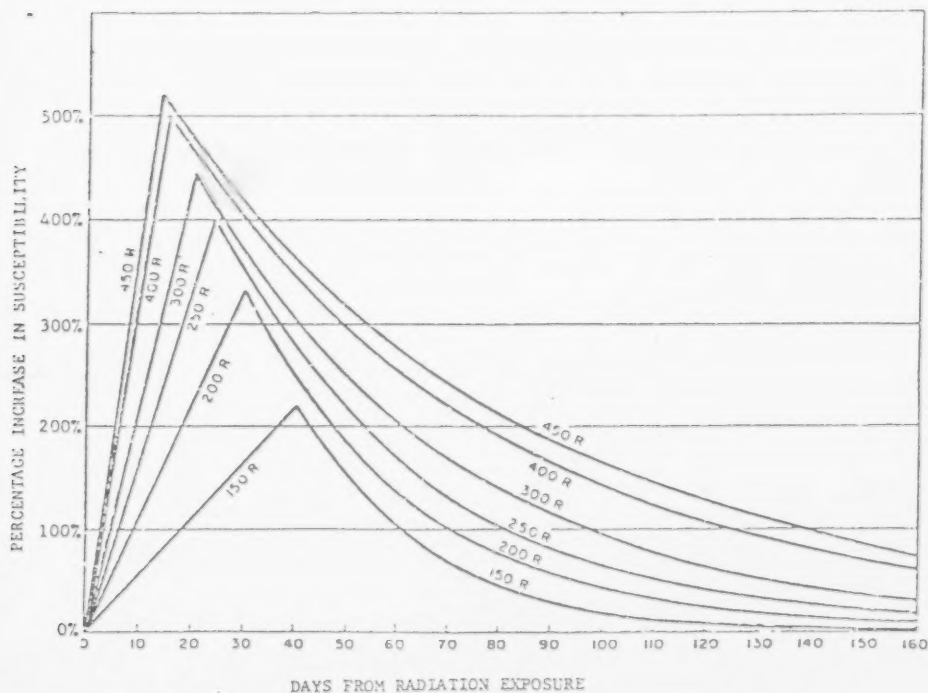
[In meters]

Material	Density (kilograms per cubic meter)	Neutrons	Initial gamma rays	Fallout gamma rays
Iron.....	7,860	0.08	0.11	0.084
Concrete.....	2,350	.24	.41	.28
Earth.....	1,600	.32	.61	.41
Water.....	1,000	.14	.99	.61
Wood.....	640	.18	1.60	.97

RADIATION PROTECTION FACTORS

Structure	Neutrons	Initial gamma-rays	Fall-out gamma-rays
Frame house.....	1.2-3	1.2-1	1.5-30
Basement.....	1.2-10	1.7-10	10-20
Multistory building:			
Upper stories.....	1-1.1	1.1-1.2	100
Lower stories.....	1.2-3	1.5-3	10
Shelter partly above ground:			
With 60-cm earth cover.....	12-50	15-30	50-200
With 90-cm earth cover.....	20-100	50-150	200-1,000
Concrete blockhouse shelter:			
With 20-cm walls.....	2-3	5-10	10-150
With 30-cm walls.....	2.5-5	10-20	30-1,000
With 60-cm walls.....	5-10	50-150	500-10,000

FIGURE 1



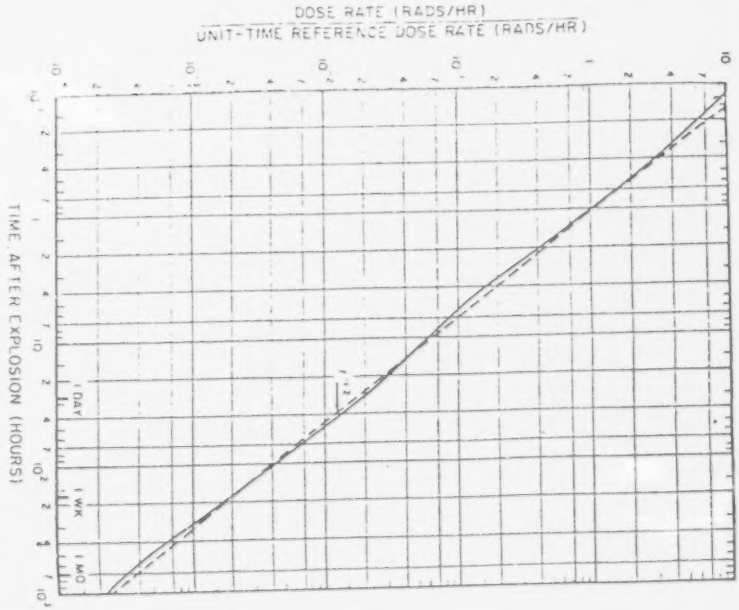
A. W. Voors, and B. S. H. Harris, Postattack Communicable Respiratory Diseases, R-OU-493, The Research Triangle Institute (November 1970), sponsored by Office of Civil Defense, p. 7-25.

FIGURE 2

From: S. Glasstone and P. J. Dolan: *The Effects of Nuclear Weapons*, U.S. Department of Defense, 1977

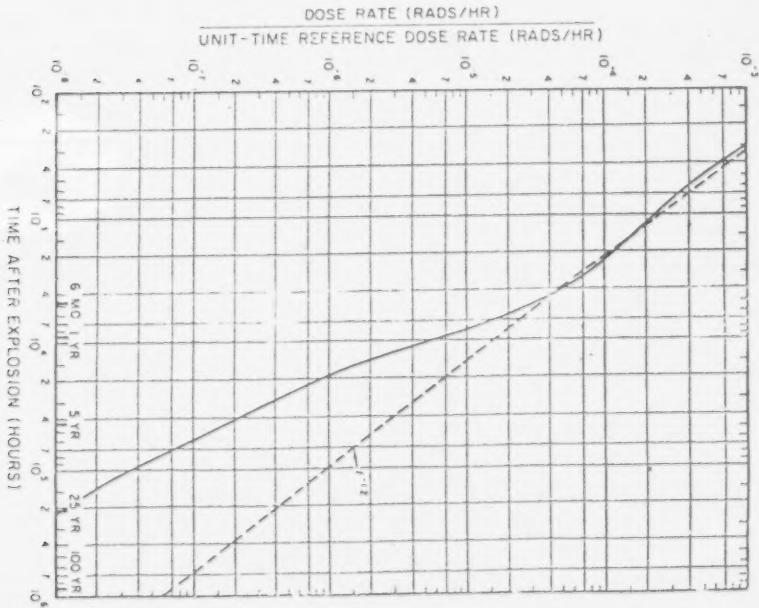
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Figure 2, *Top* Dependence of dose rate from early fallout upon time after explosion



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RESIDUAL NUCLEAR RADIATION AND FALLOUT



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